COMPTES RENDUS DE LA VINGT ET UNIÈME CONFERENCE

UNION INTERNATIONALE DE CHIMIE PURE ET APPLIQUÉE
INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY
(I. U. P. A. C.)

COMPTES RENDUS DE LA VINGT ET UNIÈME CONFÉRENCE

XXI

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OBITUARIES

At the opening of the Council meeting the President read the names of those chemists, connected with IUPAC, who had died since the last Conference:

Australia
Charles E. Fawsitt, Prof.
Sir David Rivett

France
Maurice Dodero, Prof.
René Dubrisay, Prof.
Georges Dupont, Prof.
Paul Lebeau, Prof.
Paul Mondain-Monval, Prof.

Italy
Maria Bakunina, Prof.
Francesco Giordani, Prof.
Luigi Rolla, Prof.

United Kingdom
Sir Alfred Egerton
Sir Ian Heilbron

USA
H.L. Schlesinger, Prof.

ADDRESS TO THE ROYAL SOCIETY

The International Union of Pure and Applied Chemistry greets the Royal Society as it celebrates its Tercentennial Year.

The Royal Society, founded during a period of political unrest and international tension, has stood firmly for freedom of scientific investigation and for co-operation among scientists of all nations. It has afforded precious initiative in the foundation of international scientific bodies and throughout has provided them with exceptional moral and material support.

The International Union of Pure and Applied Chemistry owes much to the foresight and unselfish devotion of the chemists of Great Britain, many of whom have served it officially and on whom reliance could always be placed for sound advice. The Union salutes the Royal Society as the official adhering body for Great Britain and through it it also salutes the chemists of the British Commonwealth of Nations to whom it and the science of chemistry owe so much.

No greater wish may be expressed than that the Royal Society should prosper and exert influence during the next three hundred years as it has in the past.

1660 1960

PRO SALUTE REGIAE SOCIETATIS

OPTIMA VOTA NUNCUPAT CONSOCIATIO HOMINUM DOCTORUM OMNIUM NATIONUM, QUI ARTEM CHEMICAM ET IN THEORIA ET IN PRAXI EXERCENT. REGIA SOCIETAS INTER DISCORDIAS CIVILES ET INTER GENTIUM SIMULTATES OLIM CONSTITUTA NULLO TEMPORIS PUNCTO INTERMISSO FIRMITER LIBERAE INDAGATIONI SCIENTIARUM OPERAM NAVAVIT · COMMUNIA STUDIA VIRORUM DOCTORUM OMNIUM NATIONUM ALUIT ET AD EFFECTUM PERDUXIT · SPONTE ADUNATIONES STUDIORUM INTER NATIONES COMMUNICANDORUM CONSTITUENDAS CURAVIT · INPRIMIS REGIA SOCIETAS ILLAS CONSOCIATIONES MODO NATAS EXIMIA AUCTORITATE SUA ET OPIBUS ADIUVIT ·
CONSOCIATIO NOSTRA VIRIS ARTEM CHEMICAM IN BRITANNIA EXERCENTIBUS IMMENSAM DEBET GRATIAM PRO SAPIENTI EORUM PROVIDENTIA ET PRO LIBERALIBUS OFFICIIS · SAEPISSIME ENIM CONSOCIATIO OFFICIALITER EORUM OPERA USA EST NEQUE UMQUAM OPTIMO CONSILIO AUT CERTISSIMIS ARGUMENTIS CONFIRMATO RESPONSO CARUIT, NEQUE FIDES IN IIS POSITA UMQUAM DECEPTA EST. CONSOCIATIO HOMINUM DOCTORUM OMNIUM NATIONUM, QUI ARTEM CHEMICAM ET IN THEORIA ET IN PRAXI EXERCENT, REGIAE SOCIETATI, MEMBRO SUO BRITANNICO, SALUTEM DICIT PLURIMAM, NEC MINUS OMNIBUS, QUI ARTI CHEMICAE IN TOTA CONFOEDERATIONE NATIONUM BRITANNICARUM OPERAM DANT, QUIA ET IPSA ET TOTA SCIENTIA CHEMICA MAXIMAM EIS DEBET GRATIAM · NIHIL MAIUS OPTAMUS QUAM UT REGIAE SOCIETATI PROSPERA CONTINGAT FORTUNA, ET UT EIUS AUCTORITAS IN ALTERA TRIA SAECULA MANEAT INVARIABILIS

MENSE IULIO MCMLX **PRAESES:** **SCRIBA:**

INTRODUCTION

For some years it has been the policy of the International Union of Pure and Applied Chemistry to hold the biennial business meeting—the Conference—in conjunction with a scientific congress organized by the host country. In 1961 the XXIst International Conference of Pure and Applied Chemistry was held in Montreal at the invitation of the National Research Council of Canada, and was followed by the XVIIIth International Congress.

It is perhaps significant that this meeting, only the second outside Europe, took place exactly ten years after the XVIth Conference which was associated with the biggest chemical congress ever held on the occasion of the Diamond Jubilee of the American Chemical Society, in Washington and New York. This highly successful congress was organized by our American colleagues under the chairmanship of Professor W. A. Noyes, Jr. who is now the President of IUPAC. 17000 chemists registered for the Jubilee celebrations and more than 7000 attended the IUPAC congress in New York.

The gathering of such vast numbers of chemists had a definite influence on the organization policy of future congresses. There was an ever-present fear that accommodation, lecture theatres and so on would be inadequate for the numbers of registrants. A decision was therefore taken in Washington that attendance at future IUPAC congresses should be limited and that topics should be carefully selected in order to achieve this end.

The Organizing Committee in Ottawa and Montreal under the chairmanship of Dr. Steacie and Prof. Marion, although limiting the scope to Physical Chemistry, Macromolecules, High Temperatures, Microtechniques, Pesticides and Wood Chemistry as was decided in Leningrad, made arrangements to accommodate many thousands of visitors. The total attendance figures were 2739. We can understand that our Canadian colleagues would have preferred to see their efforts repaid by a larger attendance.

The XXIst Conference, held on the premises of the University of Montreal, was very well attended, thanks to the efforts of the adhering countries and of the Treasury of IUPAC. This comparison indicates that attendance figures cannot be considered as a yard-stick by which to measure the scientific value of a congress—travel and accommodation expenses and climate all have a very great influence. These are facts which may perhaps be borne in mind by organizers of future congresses and are reproduced here for that reason.

There is also another matter which must be taken into consideration. It has been pointed out very frequently that the time of monster congresses is past and that small symposia on selected topics are of much more value. It is, of course, probably true that scientific progress is much better served by such small symposia in all parts of the world. On the other hand we do not feel that IUPAC can afford to ignore the interests of the great mass of chemists who work in universities, research institutes and in the chemical industry. A visit to such a great congress can be a most stimulating experience to the average chemist and we feel that it is part of the job of IUPAC to ensure that, at least, once in his lifetime, every chemist has such an opportunity and to bring congresses to the chemists at least, say, once every 20 years.

If we divide the world arbitrarily into 10 areas and hold a congress every two years in strict rotation throughout these areas, then once in 20 years nearly every chemist will have the stimulus of attending a congress, hearing new views and ideas and meeting many more of his fellow-workers.

It is clear, however, that if such a meeting is to reach a large number of chemists then it must be as wide in scope as possible and, in order to be worthwhile scientifically, it must have many top-class lecturers. The organization of congresses and symposia is nearly always influenced and, in fact, decided by the 'men at the top' who suffer from too many such meetings. This attitude should not, however, be allowed to over-ride the interests of the 'rank-and-file' who outnumber them by many thousands and who cannot be ignored.

From the scientific point of view, the XVIIIth Congress was an outstanding success, very largely due to the magnificent efforts of our Canadian friends who invited a very large number of lecturers as shown below:

Plenary Lectures

Prof. F.S. Dainton, Leeds (GB): "New Horizons in Physical Chemistry"
Prof. R. Daudel, Paris (France): "Some Recent Results concerning the Relations between Structure and Chemical Reactivity of Organic Molecules"
Academician N.N. Semenov, Moscow (USSR): "Certain Chemical Reactions at Reduced Temperatures and Related Problems of Energy Transfer"
Prof. G. Schwarzenbach, Zurich (Switzerland): "Metastable Products of Inorganic Molecules and Ions formed by Proton Addition and Elimination"
Prof. R.H. Wilhelm, Princeton (USA): "Progress toward the a priori design of Chemical Reactors"

Sectional Lectures

A. Physical Chemistry

Sec. A.1 *Structure and Reactivity of Small Molecular Species*

Prof. P. Goldfinger, Brussels (Belgium): "Reactions of Halogen Atoms"
Dr. A.S. Gordon, China Lake, Cal. (USA): "Some Reactions of Cyclo-Alkyl Radicals"
Dr. G. Herzberg, Ottawa (Canada): "The Spectra and Structures of Free Radicals"
Prof. H.C. Longuet-Higgins, Cambridge (GB): "The Theoretical Chemistry of Excited Molecules"
Prof. R.S. Mulliken, Chicago (USA): "Some Recent Progress on the Electronic Structure of Molecules"
Prof. O. Osberghaus, Freiburg (Germany): "Mass Spectroscopic Investigations on the Unimolecular Decay Products of Neutral and Ionised Hydrocarbons"
Dr. V.L. Tal'Rose, Moscow (USSR): "Reactions of Ions and Molecules in the Gas Phase"

Sec. A.2 *Solid State*

Dr. D.W.J. Cruickshank, Leeds (GB): "The Role of 3d-Orbitals in π-Bonds between Si, P. S or Cl and O or N"
Dr. D.L Dexter, Rochester, N.Y. (USA): "Excitation Processes in Crystals"
Prof. M. Magat, Paris (France): "Reactions of Organic Radicals in the Solid State Between 90° and 273 °K"

Dr. S.A. Rice. Chicago (USA): "Molecular Motion in Solids"
Prof. F.C. Tompkins, London (GB): "Imperfections and Chemical Reactivity"

Sec. A.3 *Chemical and Thermodynamic Properties at High Temperatures*
Condensed States

Prof. J.L. Margrave, Madison (USA): "Production and Measurement of High Temperatures"
Prof. H. Nowotny, Vienna (Austria): "Crystal Structure and Stability of Refractory Phases"
Prof. F. Trombe, Paris (France): "Heating and Experimentation without Contamination at High Temperatures"
Gaseous States
Dr. I. Fells, Sheffield (GB): "Ionization Processes in Gases and their Application to Energy Conversion Systems"
Mr. Bela Karlovitz, Pittsburgh (USA): "Flames Augmented by Electric Power"
Prof. N. Manson, University of Poitiers (France): "The Possibility of Checking Thermodynamic Properties by means of Detonation Characteristics"
Thermodynamic Properties
Prof. Haakon Flood, Trondheim (Norway): "Thermodynamics and Structure of Molten Salts"
Prof. P.W. Gilles, Lawrence, Kans. (USA): "Ternary Species at High Temperatures"
Dr. D.R. Lovejoy, Ottawa (Canada): "The Temperature Scale above 1000 °C"

Sec. A.4 *Nuclear Chemistry*

Dr. J.M. Alexander, Berkeley, Cal. (USA): "Heavy Ion Nuclear Reactions"
Dr. G. Friedlander, New York (USA): "Review of High Energy Nuclear Reactions"
Prof. J.M. Miller, New York (USA): "Medium Energy Nuclear Reactions"

B. Applied Chemistry

Sec. B.1 *Structure and Catalytic Activity of Metal Surfaces*

Prof. R. Gomer, Chicago (USA): "Applications of Field Emission to Problems in Adsorption"
Prof. Dr. J. Horiuti, Sapporo (Japan): "Homogeneity or Heterogeneity of the Surface of Metallic Catalysts"
Dr. D.W. Pashley, Cambridge (GB): "Electron Optical Studies on the Relation between the Structure of Metal Surfaces and their Tarnish Films"
Prof. Dr. G.-M. Schwab, Munich (Germany): "Catalytic Activity of Metals"

Sec. B.2 *Metallurgical Processes*

Prof. John Chipman, Cambridge (USA): "Slag Metal Reactions in Metallurgical Processes"
Dr. W. Martin Fassell, Jr., Newport Beach, Cal. (USA): "Extractive Metallurgy at Hyper Atmospheric Pressures—its Past, Present and Future"

Prof. A.E. van Arkel, Leiden (Netherlands): "General Aspects of Less Common Metal Production"

Sec. B.3 *Electrochemistry*

Prof. J. O'M. Bockris, Philadelphia (USA): "The Structure of Molten Salts"
Prof. Paul Delahay, Baton Rouge (USA): "Some Recent Advances in the Study of Electrode Process"
Prof. R. Piontelli, Milan (Italy): "The Electrochemistry of Single Crystals"

Sec. B.4 *Plastics and High Polymers*

Dr. R.F. Boyer, Michigan (USA): "Relationship of Polymer Transition Temperatures to Chemical Structure"
Prof. S.G. Mason, Montreal (Canada): "Some Phenomena in the Rheology of Emulsions and Suspensions"
Dr. W. Reddish, Welwyn Garden City (GB): "Chemical Structure and Electrical Properties of High Polymers"
Prof. H.A. Stuart, Mainz (Germany): "Crystallization Phenomena in High Polymers"

Sec. B.5 *Wood Chemistry Symposium* (invited papers only)

Prof. T. Enkvist, Helsingfors (Finland): "New Aspects on Lignin Reactions in Kraft Pulping"
Prof. K. Freudenberg, Heidelberg (Germany): "Biogenesis and Constitution of Lignin"
Dr. D.A.I. Goring, Montreal (Canada): "The Physical Chemistry of Lignins"
Dr. J.K. Hamilton, Shelton, Wash. (USA): "The Behaviour of Wood Carbohydrates in Technical Pulping Processes"
Prof. J.J. Hermans, Syracuse (USA): "Chemical Mechanisms in the Grafting of Cellulose"
Prof. E.L. Hirst, Edinburgh (Scotland): "The Chemical Structure of the Hemicelluloses"
Prof. J.K.N. Jones, Kingston (Canada): "Biogenesis of Carbohydrates in Woods"
Prof. Bengt Lindberg, Stockholm (Sweden): "New Methods for Isolating Hemicelluloses"
Dr. J. Mann, Manchester (GB): "Modern Techniques for Estimating the Crystallinity of Cellulose"
Dr. R.H. Marchessault, Marcus Hook, Pa. (USA): "Applications of Infrared Spectroscopy to the Study of Cellulose and Wood Polysaccharides"
Dr. Hans Meier, Stockholm (Sweden): "Chemical and Morphological Aspects of the Fine Structure of Wood"
Prof. A.H. Nissan, Troy (USA): "Cellulose as a Visco-Elastic Polymer"
Prof. Kyosti Sarkanen, Syracuse (USA): "The Chemistry of Delignification in Pulp Bleaching"
Prof. Lennart G. Stockman, Stockholm (Sweden): "Recent Developments and Present Trends in Sulphite Pulping"
Dr. Kyle Ward, Jr., Appleton, Wis. (USA): "Fractional Extraction of Hemicelluloses and their Properties"

C. Analytical Chemistry

Sec. C.1 *Analysis of Metals and Minerals*

Dr. V.A. Fassel, Ames, Iowa (USA): "Recent Advances in the Spectroscopic Determination of Trace Elements in Minerals and Metals"
Dr. G.W.C. Milner, Harwell (GB): "Electrochemical Methods in Metal and Mineral Analysis"
Dr. H.A. Sloman, Teddington (GB): "The Determination of Gases in Metals"

Sec. C.2 *Analytical Chemistry of the Less Common Metals*

Prof. M. Bobtelsky, Jerusalem: "The Contribution of Heterometry to the Analytical Chemistry of the Less Common Metals"
Dr. K.L. Cheng, Princeton (USA): "Determination of Zirconium and Hafnium with some Phthaleins"
Prof. A.K. Majumdar, Calcutta (India): "On the Separation of Niobium and Tantalum"
Dr. Rudolf Pribil, Prague (Czechoslovakia): "The new Analytical Reactions of Indium and Gallium"

Sec. C.3 *Analysis of Pesticide Residues*

Dr. S. Dormal, Gembloux (Belgium): "Comparative Methods of Residue Analysis"
Dr. R.D. O'Brien, Cornell (USA): "Molecular Configuration and Activity of Pesticides as Related to Degradation and Metabolism"
Dr. W.E. Westlake, Beltsville, Md. (USA): "Objectives and Progress in Regional Pesticide Residue Projects in the USA"
Mr. F.P.W. Winteringham, Slough (GB): "Radioactive Tracer Techniques for Studying the Chemical Fate of Insecticides"

D. Organic Chemistry Symposium

Topic *Dynamic Stereochemistry* (invited papers only)

Prof. S.J. Angyal, New South Wales (Australia): "Quantitative Conformational Analysis in Carbohydrate Chemistry"
Prof. D.H.R. Barton, London (GB): "New Photochemical Reactions and their Stereochemical Specificity"
Prof. E.J. Corey, Cambridge (USA): "Recent Advances in Stereochemistry of Organic Structures"
Prof. O. Jeger, Zurich (Switzerland): "Stereochemical Aspects of Some Novel Substitution and Rearrangement Reactions"
Prof. R.U. Lemieux, Ottawa (Canada): "Non-Bonded Interaction Energies in Carbohydrate Structures"
Prof. G. Ourisson, Strasbourg (France): "Quelques aspects nouveaux de l'analyse conformationnelle"
Prof. G. Stork, New York (USA): "Stereochemical Control in Total Synthesis"
Prof. S. Winstein, Los Angeles, Cal. (USA): "Stereochemical Aspects of Homoconjugation and Anchimeric Effects"

Social Programme

The varied and interesting social programme included a Coffee Party at the "Queen Elizabeth Hotel", an open-air concert on Mount Royal by the Montreal Symphony Orchestra, a Congress Dinner, a folk-dancing display by "Les Feux Follets" and a musical ride by the famous Royal Canadian Mounted Police.

It is always a difficult matter to single out a few names as being responsible for the success of such meetings. One must, however, mention Dr. Steacie who was Honorary President of the Congress, and Professor Marion, Chairman of the Organizing Committee. It was deeply regretted that Dr. Steacie was prevented by ill health from attending the Congress and it is a pleasure to be able to report now that he was in perfect health in London recently when he took over the great task of the Presidency of ICSU. With our congratulations on his election we join our hopes that, restored to health he will be able, with his great skill and experience, to settle at least some of the problems of this organization—problems which appear at first glance insoluble but to which an answer must be found.

The Organizing Committee, which consisted of three Vice-Chairmen—Dr. H. Hoerig, Dr. Robinson Ord and Dr. I.E. Puddington in addition to Dr. Steacie and Prof. Marion, aware of the necessity for a strong secretariat, appointed a full-time Congress Secretary in the person of Mr. D. Hunka. He was assisted by Mrs. Ray Thompson. The chairmen of the various committees must also be mentioned:

Program	Dr. W.G. Schneider
Finance	Mr. H. Greville Smith
Budget	Dr. P.R. Gendron
Hotels	Mr. C.R. Burrows
Registration	Mr. G.K. Wright
Entertainment	Mr. A. Monsaroff
Tours	Dr. J.C. Clunie
Transport	Dr. R. Rivest
Ladies	Mrs. J.H. Shipley

The Ladies programme was particularly well arranged, as is so often the case with our Conferences, and for this we are deeply indebted to Mrs. Shipley and her committee. It will not be surprising if in future, many more chemists register for the ladies programme.

Those unfamiliar with the American way of life were, perhaps, a little surprised to find also a Publicity Committee whose chairman, Mr. P.A. Novikoff, kept all the lecturers extremely busy.

It may be of interest to future congress organizers to know that chemists in general do not appear to be very interested in post-congress excursions. The experiences of our Canadian colleagues in this respect do not differ from those of previous congresses.

Pre-Congress and Post-Congress Symposia

The following Symposia were oganized in more or less close connection with the Congress in Montreal:

International Symposium on Macromolecular Chemistry

The International Symposium on Macromolecular Chemistry held in Montreal, Canada, 27 July to 1 August, 1961, was organized by the Canadian High Polymer Forum and jointly sponsored by the Division of Polymer Chemistry of the American Chemical Society and the Commission on Macromolecules of the International Union of Pure and Applied Chemistry. The Symposium embraced all aspects of high polymer science with special emphasis on the newer fields of research.

International Calorimetry Conference

The International Calorimetry Conference held in Ottawa, Canada, 14 to 17 August, 1961, was jointly sponsored by the Calorimetry Conference (held annually in the United States) and by the Subcommission on Experimental Thermochemistry. The specific topics included: general thermochemistry; biological thermochemistry; calorimetry of non-reacting systems; experimental techniques and apparatus pertinent to calorimetry, such as temperature measurements and thermometers.

International Symposium on Microchemical Techniques

The 1961 International Symposium on Microchemical Techniques, organized by the Metropolitan Microchemical Society, under the sponsorship of IUPAC (Commission on Microchemical Techniques, Section of Analytical Chemistry), took place 13 through 18 August, 1961, at The Pennsylvania State University, University Park (State College, Center County), Pennsylvania (USA).

6th International Conference on Co-Ordination Chemistry

This Conference took place in Detroit from 27 August to 1 September, 1961.

The Annual General Meeting of the American Chemical Society was held in Chicago shortly after the Montreal Congress. Prof. NOYES and Prof. COPE invited all those present at the Congress to take advantage of their presence in the Americas to attend this meeting.

The Royal Canadian Mounted Police Musical Ride

The origin of the thrilling and colourful spectacle known as a musical ride appears to have been lost in antiquity. However, it is probable that this diversionary form of cavalry drill was developed, if not originated, by the cavalry regiments of Britain. British cavalrymen brought it to Canada and to the North-West Mounted Police, for it is recorded that a troop trained by Sergeant-Major Robert Belcher performed a musical ride in 1876. However, "The Ride", as it is generally known, does not appear to have become established until sometime after the institution of a police band at Regina, for nothing more is heard of it until 1887. Perhaps the combination of a band, the construction of a riding school and the incentive for indoor activities engendered by the severity of the winter that year all contributed to its resumption, for records show that several performances were given under the direction of Inspector W.G. Matthews, former Riding Master and Adjutant of the 3rd (King's Own) Hussars.

An interesting commentary on these musical rides was provided by an Eastern newspaper which charged, in effect, that the Force, being so busy with this frivolous pursuit, was permitting all kinds of heinous crimes to go unchecked in the surrounding countryside. An amusing cartoon illustrated the charges of this notably anti-Government newspaper.

A description of the complete performance would be lengthy and involved and so only the more readily identifiable figures are outlined hereunder; all figures are formed by the grouping of half-sections or sections (2's and 4's); by 8's or by individual horses and riders.

In the "Bridal Arch", one half of the Ride passes under an archway of lances formed by the other half.

The "Dome" is so called because the horses are turned in to a closely packed circle and the lances raised over their heads towards the centre, giving the impression of a dome or cupola.

The "Maze" is formed by the whole Ride following one behind the other, with the leader describing smaller and smaller circles until suddenly he reverses and leads the Ride out through the diminishing circle of horsemen.

The "Star" finds four sets of eight riders in line, each forming the point of a star and cantering in a circle in one direction.

The "Shanghai Cross" is achieved by four sets of eight riders moving in single file from the four corners of the arena, each line passing through the other at the centre.

To conclude the performance the Ride forms up at one end of the arena in two ranks. The horses stamp and fret in anticipation and then the stirring trumpet notes of the "Charge" sends the troop surging forward, front rank with lances at the "Engage".

Again the trumpet sounds and the "Rally" sends the flanks wheeling outward to lead the troop back into formation at the end of the arena. A ceremonial salute is then made in front of the box occupied by the guest of honour and the Ride moves out of the enclosure.

The musical selections to which the Ride is performed may be varied from time to time, but among the longtime favourites are the following:

Fanfare	
March On	The Maple Leaf Forever
Trot	The Keel Row—Country Gardens—Surrey with a Fringe on Top
Lance Drill	Blow the Man Down—All Day on the Prairie
Canter	Bonnie Dundee—St. Patrick's Day—Campbells are Coming—Irish Washerwoman—Hundred Pipers—Sherwood Foresters—Repaz Band
Charge	Trumpet call "The Charge" followed by drum roll
Rally	Trumpet call "The Rally"
March Past	R.C.M. Police Regimental March

XXIst Conference

The XXIst Conference of IUPAC was held on the premises of the University of Montreal, beautifully situated on the hill above the city. Prof. Noyes, Jr. presided and a list of those attending the Council Meetings will be found on page 22.

Prof. Noyes did not read his report on the General State of the Union which had already been distributed in English and French to all Bureau Members and Adhering Organizations. In his opening remarks he drew a comparison, speaking as an American, between his report and the Inauguration Speech of an American President who must address the Congress and the Senate on the State of the USA.

Great interest was shown in the meeting of the Council, as also of the Sections, Divisions and Commissions, and there was general support for the view that, in future, much more time should be allowed for discussion and that all modern technical facilities for communication, including simultaneous translation, must be provided at these sittings. In the words of Prof. Noyes, "much more time must be allowed for Council meetings. Several delegations had distinguished persons who come to Montreal merely for two sessions of three hours each. We must make the Council a much more important legislative body than it has been in the past. The Agenda for the Council must differ from the agendas of the Bureau and of the Executive Committee. In reality under 'Other Business' a mimeographed agenda must be prepared the day before the Council meeting and after the last preceding meeting of the Bureau. If simultaneous translation cannot be provided, trained persons to translate Russian, French and English must be available".

It was agreed that IUPAC must be strengthened in order to meet the needs of rapidly-developing Science and to this end, as will be seen in the Minutes (see page 119), an *ad hoc* Finance Committee (Chairman, Prof. J. Bailar) was set up and also a special committee, under the Chairmanship of Prof. P.E. Verkade with the task of finding an appropriate structure for the Union.

The Second Council Meeting on Saturday was continued over into a very good lunch generously offered by the Organizing Committee.

IUPAC had been prepared to sacrifice most of its financial reserves in order to make a success of the Conference and Congress in Montreal. This proved to be unnecessary thanks to the generosity of many of the adhering countries who by increases in their annual subscriptions, voluntary contributions, and payment of travel expenses for their titular members enabled us to reduce the deficit of the meetings to acceptable proportions. Mention must also be made of the charter flight from Paris to Montreal which resulted in an additional saving. After a great deal of work, for which we are particularly indebted to Mr. J. Givaudon of the Union des Industries Chimiques and to Mr. J.F. Ulmer of Wagons-Lits Cook in Paris, we succeeded in correlating many individual requirements and one plane of the Air France line was nearly filled.

OFFICIAL DELEGATES OF MEMBER COUNTRIES AT THE XXIst CONFERENCE

DÉLÉGUÉS OFFICIELS DES PAYS MEMBRES AUPRÈS DE LA XXIe CONFÉRENCE

Argentina (2)

Australia (4)

Dr. A.L.G. Rees, CSIRO, Division of Industrial Chemistry, Box 4.331, Melbourne
Prof. S.J. Angyal, New South Wales
Prof. G.N. Badger
Dr. J.F. Duncan

Austria (2)

Prof. Dr. H. Nowotny, Institut für Physikalische Chemie der Universität Wien, Währingerstrasse 42, Wien IX
Prof. Dr. J.W. Breitenbach, Institut für Physikalische Chemie der Universität Wien, Währingerstrasse 42, Wien IX

Belgium (4) (6)

Prof. G. Chiurdoglu, Brussels
Prof. L. d'Or, Faculté des Sciences, Liège
Prof. J. Gillis, 22, rue Joseph-Plateau, Gand
Prof. J. Timmermans, 50, avenue Franklin-Roosevelt, Brussels

Brazil (4)

Dr. W. Zattar, Rua Lucio de Mendonça, Nº 32 – Apt. 303, Tijuco, Rio de Janeiro
Dr. C.E. Nabuco de Araujo, Jr., Caixa Postal 970, Rio de Janeiro
Dr. M. Smith de Vasconcellos, Brazilian Delegation to ICAO, International Aviation Building 103, Montreal (Canada)
Prof. Fritz Feigl, Laboratorio da Procução Mineral, Avenida Pasteur 404 – Fundos, Rio de Janeiro, Estado da Guanabara

Bulgaria (2)

Canada (6)

Dr. L. Marion, National Research Council of Canada, Ottawa
Dr. P.A. Giguère, Laval University, Quebec
Dr. L. Yaffe, McGill University, Montreal
Dr. C.A. McDowell, University of British Columbia, Vancouver
Dr. I.E. Puddington, National Research Council of Canada, Ottawa
Dr. M.R. Foran, Nova Scotia Technical College, Halifax

China (Taiwan) (4)

Dr. D.Y. Chang
Dr. Ming-San Hsieh
Mr. Yen-Chen Yen

Colombia (2)

Prof. B. Fajardo Pinzon, Laboratorio Químico Nacional, Apartado 2577, Bogotá

Czechoslovakia (4)

Prof. Dr. Ing. V. Ettel, Tecjnicka 5, Prague 6-Dejvice
Dr. R. Pribil, Londynska 56, Prague 2-Vinohrady
Prof. Dr. Ing. O. Wichterle, Vaclavkova 2, Prague 6-Dejvice
Dr. J. Sicher, Na cvicisti 2, Prague 6-Dejvice

Denmark (4)

Prof. Dr. J. Bjerrum, Department of Inorganic Chemistry, Sølvgade 83, Copenhagen K
Prof. Dr. K.A. Jensen, Chemical Laboratory of the University, Østervolgade 5, Copenhagen K
Prof. Dr. S. Veibel, Department of Organic Chemistry, Sølvgade 83, Copenhagen K
Dr. K.J. Pedersen, Royal Danish Agricultural and Veterinary School, Bülowsvej 13, Copenhagen V

Finland (2)

Prof. E. Tommila, Hallitusk. 5, Helsinki
Prof. A. Ringbom, Abo Akademi, Abo

France (6) (plus 2 Bureau Members)

Prof. J. Lecomte, Membre de l'Institut, Directeur de Recherches au CNRS, Laboratoires de Recherches physiques, 1, rue Victor-Cousin, Paris-5e
Prof. J. Benard, 11, rue Pierre-Curie, Paris-5e
M. J. Givaudon, Ingénieur-Conseil à l'Union des Industries chimiques, 64, avenue Marceau, Paris-8e
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I.3.1 Subcommission 1: Electrochemical Symbols and Terminology

Sous-commission 1: Symboles et Terminologie électrochimiques

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I.3.2 Subcommission 2: Electrochemical Thermodynamics

Sous-commission 2: Thermodynamique électrochimique

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Sous-commission 3: Cinétique électrochimique

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and
II.2.3 Subcommission on chain compounds

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H. Mii, Dr., Government Industrial Research Institute, Hirate Machi, Kita Ku, Nagoya (Japan)
A. Ram, Dr., Central Glass and Ceramic Research Institute, Calcutta (India)

G. D. Rieck, Dr., Technische Hogeschool te Eindhoven, Postbus 313, Eindhoven (Netherlands)
J. P. H. Shaw, Dr., Imperial Chemical Ind. Ltd., General Chemical Division, Widnes Laboratory, Widnes, Lancs. (GB)
R. L. Thakur, Dr., Central Glass and Ceramic Research Inst., Calcutta (India)
R. F. Walker, Dr., National Bureau of Standards, Washington 25, D.C. (USA)
J. White, Prof., Department of Metallurgy, University of Sheffield, Sheffield 1 (GB)

II.3.1 Subcommission on Condensed States
Sous-Commission des Etats condensés

H. Flood, Prof., Institutt for Silikatforskning, Trondheim (Norway)
A. D. Franklin, Dr., National Bureau of Standards, Washington 25, D.C. (USA)
M. Fœx, Dr., Laborotoire de l'Energie solaire, Montlouis, Pyrénées-Orientales (France)
H. Nowotny, Prof., Tulpengasse 2, Wien VIII (Austria)
F. Trombe, Prof., Laboratoire du CNRS, 1, place A.-Briand, Bellevue, S.-et-O. (France)

II.3.2 Gas Subcommission / Sous-Commission Gaz

Vice-President: B. Lewis, Dr., Combustion and Explosive Research Inc., Oliver Bldg., Pittsburgh 22, Pa. (USA)

Secretary: E. Starkman, Prof., University of California, College of Engineering Aeronautical Sciences, Berkeley 4 (USA)

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M.W. Thring, Prof., University St. George's Square, Sheffield (GB)
P. Laffitte, Prof., Laboratoire de Chimie générale de la Sorbonne, 1, rue Victor-Cousin, Paris-5e (France)

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K. F. Herzfeld, Prof., The Catholic University, Washington 17, D.C. (USA)
J. O. Hirschfelder, Prof., University of Wisconsin, Naval Research Laboratory, Madison (USA)
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N. Manson, Prof., 5, rue des Vieilles-Boucheries, Poitiers (France)
Y.B. Zeldowich, Dr., Institute of Chemical Physics, Academy of Sciences, Moscow (USSR)

Commission on Geochemistry / Commission de Géochimie

1960–1964 *President:* C. W. Correns, Prof., Sedimentpetrographisches Institut, Universität Göttingen, Göttingen (Germany)

1959–1963 *Vice-President:* A. P. Vinogradov, Academician, Vernadsky Institute of Geochemistry, Academy of Sciences, Moscow V-133 (USSR)

1959–1963 *Secretary:* E. Ingerson, Prof., Geology Department University of Texas, Austin, Texas (USA)

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1959–1963 L. H. Ahrens, Prof., Department of Chemistry University of Cape Town, Rondebosch, Cape Province (South Africa)

1961–1964 A. A. Smales Dr., 83 Bath St., Abingdon, Berkshire (GB)

1961–1964 S. Landergren, Dr., Geological Survey of Sweden, Stockholm 50 (Sweden)

1959–1963 K. Sugawara, Prof., Chemical Institute, Faculty of Science, Nagoya University, Chikusa-ku, Nagoya (Japan)

1958–1961 H. C. Urey, Prof., University of California, La Jolla, Cal. (USA)

1958–1963 L. R. Wager, Prof., Department of Geology and Mineralogy, University Museum, Oxford (GB)

19 . .–1963 F. E. Wickman, Prof., Mineralogiska avdelingen, Naturhistoriska Riksmuseet, Stockholm 50 (Sweden)

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E. Szadeczky-Kardos, Prof., Egytemi Földtani Intezet Muzem-Kört, 4/a Budapest VIII (Hungary)

H. G. Thode, Prof., Hamilton College, McMaster University, Hamilton, Ontario (Canada)
S. I. Tomkeieff, Prof., Geology Department, King's College, University of Durham, Newcastle-upon-Tyne (GB)
S. Tsuboi, Prof., Geological Institute, Faculty of Science, University of Tokyo, Tokyo (Japan)
K. H. Wedepohl, Dr., Mineralogisch-petrographisches Institut, Lotzestrasse 16/18, Göttingen (Germany)
H. S. Yoder, Dr., Geophysical Laboratory, 2801 Upton Street, Washington 8, D.C. (USA)

III. SECTION OF ORGANIC CHEMISTRY
SECTION DE CHIMIE ORGANIQUE

President: Prof. H. Erdtman

Section Committee / Comité de Section

1959–1963 *President:* H. Erdtman, Prof., Royal Institute of Technology, Stockholm 70 (Sweden)
1959–1963 *Vice-President:* L. Marion, Prof., National Research Council, Division of Pure Chemistry, Ottawa 2 (Canada)
1961–1965 *Secretary:* T. Urbanski, Prof., Ecole polytechnique, 75, rue Koszykowa, Warsaw (Poland)

Members

1959–1963 A. C. Cope, Prof., Laboratory of Organic Chemistry, Massachusetts Institute of Technology, Cambridge, Mass. (USA)
1961–1965 K. Nakanishi, Prof., Tokyo Kyoiku University, Otsuka, Bunkyo, Tokyo (Japan)
1961–1965 G. Ourisson, Prof., Université de Strasbourg (France)
1961–1965 F. Weygand, Prof., Technische Hochschule, Munich (Germany)

III.1 Commission on the Nomenclature of Organic Chemistry
Commission de Nomenclature de Chimie organique

19 . .–19 . . *President:* P. E. Verkade, Prof., Ary Schefferstraat 217, 's-Gravenhage, The Hague (Netherlands)
19 . .–19 . . *Secretary:* H. S. Nutting, Dr., The Dow Chemical Company, Midland, Michigan (USA)

Members

19 . .–19 . . R. S. Cahn, Dr., The Chemical Society, 38, York Terrace, Regent's Park, London N.W.1 (GB)
19 . .–19 . . L. T. Capell, Dr., The Chemical Abstracts Service, The Ohio State University, Columbus 10, Ohio (USA)
19 . .–19 . . G.M. Dyson, Dr., Chemical Abstracts, The Ohio State University, Columbus 10, Ohio (USA)
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19 . .–19 . . N. Lozac'h, Prof., Laboratoire de Chimie, Nouvelle Université, Caen, Calvados (France)

19..–19.. A. D. MITCHELL, Dr., "Holmsbury", 26 Beehive Lane, Ilford, Essex (GB)
19..–19.. S. VEIBEL, Prof. of Organic Chemistry at the Technical University of Denmark, Sølvgade 83, Copenhagen K (Denmark)

III.2 Commission on Codification, Ciphering and Punched Card Techniques

Commission de Codification, de Chiffrage et de Triage des Combinaisons organiques

19..–19.. *President:* P.E. VERKADE, Prof., Ary Schefferstraat 217, The Hague (Netherlands)

19..–19.. *Secretary:* J.W. PERRY, Numerical Analysis Laboratory, University of Arizona, Tucson, Arizona (USA)

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19..–19.. CH. BERNIER, Dr., Chemical Abstracts, The Ohio State University, Columbus 10, Ohio (USA)
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19..–19.. N. LOZAC'H, Prof., Laboratoire de Chimie, Nouvelle Université, Caen, Calvados (France)
19..–19.. H. S. NUTTING, Dr., The Dow Chemical Company, Midland, Michigan (USA)

IV. SECTION OF BIOLOGICAL CHEMISTRY
SECTION DE CHIMIE BIOLOGIQUE

President: Prof. E.J. KING

Section Committee / Comité de Section

1959–1963 *President:* E. J. KING, Prof., Postgraduate Medical School, Ducane Road, London W.12 (GB)

1959–1963 *Secretary:* C. E. DALGLIESH, Dr., Miles Laboratories Ltd., Stoke Court, Stoke Poges, Bucks. (GB)

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1960–1963 K. BAILEY, Dr., Department of Biochemistry, University of Cambridge (GB)
1960–1964 S. BERGSTRØM, Prof., Medicinsk-kemiska Institutionen, Karolinska Institutet, Stockholm 60 (Sweden)
1960–1964 F. CEDRANGOLO, Prof., Istituto di Chimica biologica, Via Costantinopoli 16, Napoli (Italy)

1960–1963 M. Freeman, Dr., River House, A 202, 1400 South Joyce Street, Arlington, Va. (USA)

1960–1963 V. N. Orekhovitch, Prof., Institute of Biological and Medical Chemistry of the USSR Academy of Medical Sciences, Pogodin Street 10, Moscow G-117 (USSR)

Co-ordinating Committee of the International Union of Pure and Applied Chemistry and the International Union of Biochemistry

Comité de Co-ordination entre l'Union internationale de Chimie pure et appliquée et l'Union internationale de Biochimie

Representatives of IUPAC / Représentants de l'IUPAC

President (or his delegate) W. A. Noyes, Jr., Prof.

President Section of Biological Chemistry E. J. King, Prof.

Secretary Section of Biological Chemistry C. E. Dalgliesh, Dr.

Representatives of IUB / Représentants de l'IUB

President M. Florkin, Prof., Laboratoire de Biochimie, Université de Liège, 17, place Delcour, Liège (Belgium)

Vice-President E. H Stotz, Prof., University of Rochester, School of Medicine and Dentistry, Rochester 20, NY (USA)

Secretary R. H. S. Thompson, Prof., Department of Clinical Pathology, Guy's Hospital Medical School, London S.E.1 (GB)

IV.1 Commission on the Nomenclature of Biological Chemistry
Commission de Nomenclature de Chimie biologique

1958–1961 *President:* W. Klyne, Prof., Westfield College, Hampstead, London N.W.3 (GB)

1958–1961 *Secretary:* E. C. Slater, Prof., Laboratorie voor Physiologische Chemie, J. D. Meyerplein 3, Amsterdam C (Netherlands)

Members

1959–1963 D. Bertrand, Dr., Institut Pasteur, 28, rue Dr-Roux, Paris-15e (France)

1959–1963 W. Grassmann, Prof., Max-Planck-Institut, Schillerstrasse 46, München 15 (Germany)

1958–1961 L. Hellerman, Prof., Department of Physiological Chemistry, The Johns Hopkins School of Medicine, 710 N. Washington Street, Baltimore 5, Md. (USA)

1959–1963 O. Hoffmann-Ostenhof, Prof., Währingerstr. 38, Wien IX (Austria)

1959–1963 B. Keil, Dr., Institute of Organic Chemistry, Academy of Sciences, Na cvičišti 2, Prague (Czechoslovakia)

1959–1963 B. Malmström, Dr., Biochemiska Insitutionen, Universitetet, Uppsala (Sweden)

1959–1963 R. Schwyzer, Prof., Ciba AG, Basel (Switzerland)

IV.2 Protein Commission / Commission des Protéines

1959–1963 *President:* K. Bailey, Dr., Department of Biochemistry, University of Cambridge, Cambridge (GB)

1959–1963 *Vice-President:* M. Ottesen, Prof., Carlsberg Laboratorium, Copenhagen, Valby (Denmark)

1958–1961 *Secretary:* R. Lontie, Prof., 6, Dekenstraat, Louvain (Belgium)

Members

1959–1963 P. Desnuelle, Prof., place Victor-Hugo, Marseille (France)
1954–19 . . H. Neurath, Prof., Department of Biochemistry, School of Medicine, University of Washington, Seattle 5, Washington (USA)
1958–19 . . J. Porath, Dr., Biokemiska Institutionen, Uppsala Universitetet, Uppsala (Sweden)
1959–1963 H. E. Schultze, Prof., Behringwerke AG, Marburg/Lahn (Germany)
1959–1963 R. Schwyzer, Prof. Dr., Ciba AG, Basel (Switzerland)
1958–19 . . J. W. Williams, Prof., University of Wisconsin, Madison 6, Wisconsin (USA)

IV.3 Commission on Clinical Chemistry Commission de Chimie clinique

1959–1963 *President:* M. E. Freeman, Dr., 1400 South Joyce Street, A202, Arlington, Va. (USA)

1952–1962 *Secretary:* B. Josephson, Dr., St. Erik's Hospital, Stockholm 18 (Sweden)

Members

1959–1963 J. E. Courtois, Prof., 4, av. de l'Observatoire, Paris (France)
1959–1963 K. Hinsberg, Prof., Academy of Medicine, Düsseldorf (Germany)
1959–1963 S. H. Jackson, Dr., Hospital for Sick Children, 555 University Avenue, Toronto 2, Ontario (Canada)
1959–1963 N. F. MacLagan, Prof., Westminster Medical School, Horseferry Road, London S.W.1 (GB)
1959–1963 V. Orekhovich, Prof., Academy of Medical Science, Pogodin Street 10, Moscow G-117 (USSR)
1951–1962 J. C. M. Verschure, Dr., Emma Laan 25, Amsterdam Z (Netherlands)

National Representatives

Belgium: R. Ruyssen, Prof., Vaderlandstraat 47, Gand

Czechoslovakia: J. Horejsi, Prof., Czechoslovak Biochemical Society, U Nemocnice 5, Prague II

Switzerland: M. C. Sanz, Dr., Laboratoire central de l'Hopital Cantonal, Genève

V. SECTION OF ANALYTICAL CHEMISTRY
SECTION DE CHIMIE ANALYTIQUE

President: Prof. H. Malissa

Section Committee / Comité de Section

1961–1965 *President:* H. Malissa, Prof., Technische Hochschule, Getreidemarkt 9, Vienna (Austria)

1962–1965 *Secretary:* P.N. Degens, Jr., Dr., Badhuisweg 3, Amsterdam (Netherlands)

Members

1959–1963 I. P. Alimarin, Prof., V. I. Vernadsky Institute of Geochemistry and Analytical Chemistry Academy of Sciences, Vorobievskoye Shosse, 47a, Moscow V-133 (USSR)

1961–1965 R. Belcher, Prof., Department of Chemistry, The University, Edgbaston, Birmingham 15 (GB)

1961–1965 G. Charlot, Prof., Ecole supérieure de Physique et Chimie industrielles, 10, rue Vauquelin, Paris-5e (France)

1961–1965 P. N. Delahay, Prof., Chemistry Department, Louisiana State University, Baton Rouge 3, Louisiana (USA)

1961–1965 W. Fischer, Prof., Anorganisch-chemisches Institut, Callinstrasse 46, Hannover (Germany)

1961–1965 R. Pribil, Prof., Londynska 56, Praha 2-Vinohrady (Czechoslovakia)

1961–1965 N. Tanaka, Prof., Department of Chemistry, Tohoku University, Sendai (Japan)

1961–1965 P.W. West, Prof., Department of Chemistry, Louisiana State College University, Baton Rouge 3, La. (USA)

V.1 Commission on Analytical Reactions
Commission des Réactions analytiques

1961–1965 *President:* S. Veibel, Prof., Den Polytekniske Laereanstalts, Organisk-Kemiske Laboratorium, Sølvgade 83, Copenhagen (Denmark)

1959–1962 *Secretary:* W. C. Johnson, Hopkin & Williams Ltd., Freshwater Road, Chadwell Heath, Essex (GB)

Members

1961–1965 N. D. Cheronis, Prof., Department of Chemistry, Brooklyn College, Brooklyn 10, New York (USA)

1961–1965 F. Feigl, Prof., Ministerio da Agricultura, Lab. Pasteur, 404, Rio de Janeiro (Brazil)

1961–1965 M. Jurecek, Prof., School of Chemical Engineering, Pardubice (Czechoslovakia)

1961–1965 A.K. Mukherji, Dr., Louisiana State University in New Orleans, Department of Chemistry, New Orleans, La. (USA)

1961–1965 M. Pesez, Dr., Directeur de la Division Analytique, Roussel-Uclaf, 102, route de Noisy, Romainville, Seine (France)

1959–1962 F. J. Welcher, Prof., Department of University Extension, 518 North Delaware Street, Indianapolis 4, Ind. (USA)

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D. Goldstein, Dr., Laboratorio da Proção Mineral, Avenida Pasteur, 404, Rio de Janeiro (Brazil)

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E. Sawicki, Dr., Division of Air Pollution, Taft Sanitary Engineering Center, 4676 Columbia Parkway, Cincinnati 26, Ohio (USA)

W. I. Stephen, Dr., Department of Chemistry, The University, Edgbaston, Birmingham 15 (GB)

V.2 Commission on Microchemical Techniques
Commission des Techniques microchimiques

1958–1962 *President:* A. Steyermark, Dr., Microchem. Dept., Hoffmann-La Roche Inc., Roche Park, Nutley 10, N.J. (USA)

1958–1962 *Secretary:* W. Schöniger, Dr., Microanal. Dept., Sandoz Ltd., Basle 13 (Switzerland)

Members

1958–1962 S. Hölzel, Dipl. Chem., Österreichische Stickstoffwerke AG, Linz/Donau (Austria)

1958–1962 J. Körbl, Ing., Research Institute of Pharmacy and Biochemistry, Kouřimská 17, Prague XII (Czechoslovakia)

1958–1962 R. Lévy, Dr., Section de microanalyse, Laboratoire municipal de Paris, 39bis, rue de Dantzig, Paris-15e (France)

1959–1962 A. J. Llacer, Dr., Dirección nacional de Química, Rosario (Argentina)

1959–1962 R.J. Magee, Dr., University of Belfast, Chem. Dept., Belfast, North Ireland (GB)

1959–1962 H. Spitzy, Dr., Paracelsus-Institut, Chem. Abteilung, Bad Hall (Austria)

Associate Members

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G. Ingram, Research Laboratory, Courtaulds Ltd., Maidenhead, Berks. (GB)

V.3 Commission on Nomenclature of Analytical Chemistry
Commission de Nomenclature de Chimie analytique

1959–1963 *President:* F. BURRIEL-MARTI, Prof., Departamento de Química analítica, Serrano 119, Madrid (Spain)

1961–1963 *Secretary:* D. AMBROSE, Dr., DSIR, National Chemical Laboratory, Teddington, Middlesex (GB)

Members

1961–1963 I. P. ALIMARIN, Prof., V. I. Vernadsky Institute of Geochemistry and Analytical Chemistry, Vorobievskoys shosse 47a, Moscow V-135 (USSR)
1961–1963 E. BAYER, Dr., Institut für Organische Chemie der Technischen Hochschule, Englerstrasse 11, Karlsruhe 11 (Germany)
1959–1963 G. CHARLOT, Prof., Laboratoire de Chimie analytique, Faculté des Sciences de Paris, 10, rue Vauquelin, Paris-5e (France)
1961–1963 L. ERDEY, Prof., Budapesti Muszaki Egyetem, Altalanos Kemiai Tanszek, Gellert-ter 4, Budapest XI (Hungary)
1961–1963 R. PRIBIL, Prof., Landynska 56, Prague 12 (Czechoslovakia)
1961–1963 E. B. SANDELL, Prof., School of Chemistry, University of Minnesota, Minneapolis, 14, Minn. (USA)

V.4 Commission on Spectrochemical and other Optical Procedures for Analysis
Commission de Spectranalyse et autres méthodes optiques d'Analyse

1959–1963 *President:* A. C. MENZIES, Dr., Hilger and Watts Ltd., 98 St. Pancras Way, Camden Road, London N.W.1 (GB)

1959–1963 *Secretary:* E. LŒUILLE, Dr., GAMS, (LNE) 1, rue Gaston-Boissier, Paris-15e (France)

Members

1959–1963 G. DUYCKAERTS, Prof., Laboratoire de Chimie analytique, Université de Liège, 2, rue Armand-Stévart, Liège (Belgium)
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1961–1965 H. KAISER, Prof., Institut für Spektrochemie und angewandte Spektroskopie, Marsbruchstrasse 186, Bau 1, Dortmund-Aplerbeck (Germany)
1959–1963 S. L. MANDELSTAM, Prof., Lebedev Physical Institute, Moscow University, K-12, pr Sapunova, Moscow 127 (USSR)
1959–1962 E. W. SALPETER, Dr., Laboratorio Astrofisico, Specola Vaticana, Castel Gandolfo (Italy)
1959–1963 B. F. SCRIBNER, Dr., Division of Chemistry, National Bureau of Standards, Washington 25, D.C. (USA)

Associate Members

M. G. MELLON, Prof., Purdue University, Department of Chemistry, Lafayette, Indiana (USA)

V.5 Commission on Electrochemical Data
Commission des Données électrochimiques

1957–1963 *President:* P. Delahay, Prof., Department of Chemistry, Louisiana State University, Baton Rouge, La. (USA)

1961–1965 *Secretary:* H. Gerischer, Prof., Max-Planck-Institut, Stuttgart (Germany)

Members

1961–1965 L. Badoz-Lambling, Dr., Faculté des Sciences de Paris, Laboratoire de Chimie analytique, 10, rue Vauquelin, Paris-5e (France)
1959–1963 A. Hickling, Prof., Department of Chemistry, University of Liverpool, Liverpool (GB)
1961–1965 W. Kemula, Prof., Ul. Pasteur a, 1, Warsaw (Poland)
1961–1965 I. M. Kolthoff, Prof., Department of Chemistry, University of Minnesota, Minneapolis 14, Minn. (USA)
1961–1965 G. Kortüm, Prof., Physikalisch-chemisches Institut der Universität, Wilhelmstrasse, Tübingen (Germany)
1961–1965 N. Tanaka, Prof., Department of Chemistry, Tohoku University, Sendai (Japan)

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C. Charlot, Prof., Faculté des Sciences de Paris, Laboratoire de Chimie analytique, 10, rue Vauquelin, Paris-5e (France)
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D. Perrin, Dr., Department of Medical Chemistry, The John Curtin School of Medical Research, The Australian National University, Canberra, A.C.T. (Australia)
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E. Vianello, Dr., Università di Padua, Istituto di Chimica fisica, Via Leonardo Loredan 4, Padua (Italy)
P. Zuman, Dr., Polarographic Institute, Czechoslovak Academy of Science, Prague 1, Opletalova 25 (Czechoslovakia)

Associate Members from the Electrochemistry Commission

Appointed in the Commission on Electrochemical Data

W. Hamer, Dr., Chief, Electrochemistry Section, National Bureau of Standards, Washington 25, D.C. (USA)
M. Pourbaix, Dr., Faculté des Sciences appliquées, Université libre de Bruxelles, 50, av. Franklin-D.-Roosevelt, Brussels (Belgium)
G. Valensi, Prof., Faculté des Sciences, Laboratoire de Chimie minérale, Poitiers (France)

V.6 Commission on Equilibrium Data
Commission des Données d'Equilibre

1959–1963 *President:* D. N. HUME, Department of Chemistry, Massachusetts Institute of Technology, Cambridge 39, Mass. (USA)

Members

1961–1965 J. BJERRUM, Prof., Chemical Laboratory of the University, Solvgade 83, Copenhagen (Denmark)
1961–1965 D. DYRSSEN, Dr., Royal Institute of Technology, Chemical Department, Kemistvägen, Stockholm (Sweden)
1961–1965 H. FREISER, Prof., Chemical Department, University of Arizona, Tucson, Ariz. (USA)
1957–1963 J. C. HINDMAN, Dr., Argonne National Laboratory, Lemont, Ill. (USA)
1961–1965 A. E. MARTELL, Prof., Chemical Department, Illinois Institute of Technology, Chicago, Ill. (USA)
1961–1965 L. G. SILLEN, Prof., Department of Inorganic Chemistry, Royal Institute of Technology, Kemistvägen, Stockholm (Sweden)
1961–1965 K. B. YATSIMIRSKI, Prof., Ivanoskii Khimiko, Technologecheskii Institute, Utsa Lenina 5, Ivanovo (USSR)

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H. M. N. H. IRVING, Prof., Chemical Department, University of Leeds, Leeds (GB)
I. LEDEN, Dr., Department of Physical Chemistry, University of Lund (Sweden)
A. J. RINGBOM, Prof., The Swedish University of Åbo, Turku (Finland)
G. SCHWARZENBACH, Prof., Chemisches Institut der ETH, Zürich (Switzerland)
T. TAKAHASHI, Prof., Institute of Industrial Science, University of Tokyo, Yayoi cho, Chiba City (Japan)

VI. APPLIED CHEMISTRY SECTION
SECTION DE CHIMIE APPLIQUÉE

President: Dr. J. H. BUSHILL

Section Committee / Comité de Section

1961–1963 *President:* J. H. BUSHILL, Dr., The Laboratories, 149 Hammersmith Road, London W.14 (GB)
1961–1963 *Vice-President:* R. TRUHAUT, Prof., Faculté de Pharmacie, 4, av. de l'Observatoire, Paris-6e (France)
1961–1963 *Secretary:* H. J. BUNKER, 17 Radnor Road, Twickenham, Mddx. (GB)

Members

1961–1963 G. DRING, Bakelite Ltd., 12–18 Grosvenor Gardens, London S.W.1 (GB)
1961–1963 J. C. GAGE, Dr., I.C.I. Ltd., Industrial Hygiene Research Labs., The Frythe, Welwyn, Herts. (GB)

1961–1963 W. Gallay, Dr., the E. B. Eddy Co., Hull, P.Q. (Canada)

1961–1963 R. A. E. Galley, Dr., Shell Research Ltd., Woodstock Agricultural Research Centre, Sittingbourne, Kent (GB)

1961–1963 L. A. Jordan, Dr., Oakhill Drive, Langley Road, Surbiton, Surrey (GB)

1961–1963 R.F. Light, Standard Brands Inc., 625 Madison Avenue, New York (USA)

1961–1963 B. L. Oser, Dr., Maurice Avenue at 58th Street, Maspeth 78, New York City, (USA)

1961–1963 B. A. Southgate, Dr., Water Pollution Research Laboratories, Elder Way, Stevenage, Herts. (GB)

1961–1963 G. Wolff, Dr., 180, faubourg St-Denis, Paris-10e (France)

Four additional members to be appointed

VI.1 Food Division / Division de Bromatologie

1961–1963 *President:* B. L. Oser, Dr., Food and Drugs Research Lab. Inc., Maurice Avenue at 58th Street, Maspeth 78, New York City (USA)

1961–1963 *Secretary:* A. François, Prof., Dir. du Service de Biochimie du CNRZ, Institut national de la Recherche agronomique, Domaine de Vilocat, Jouy-en-Josas, S.-et-O. (France)

Members

1961–1963 A.C. Frazer, Prof., Dept. of Medical Biochemistry and Pharmacology, University of Birmingham, Birmingham 15 (GB)

1957–1963 O. Högl, Prof., Head of Department of Public Health, Bollwerk 14, Berne (Switzerland)

1961–1963 D.W. Kent-Jones, Dr., The Laboratories, Dudden Hill Lane, London, N.W.10 (GB)

1957–1962 J. F. Reith, Prof., Toxicologie van de Reijksuniversiteit, Catharijnesingel, 60, Utrecht (Netherlands)

1961–1963 S. W. Souci, Prof., Deutsche Forschungsanstalt für Lebensmittelchemie, Leopoldstrasse 175, München 23 (Germany)

1961–1963 R. Truhaut, Prof., Faculté de Pharmacie, 4, av. de l'Observatoire, Paris-6e (France)

VI.1.1 Trace Elements in Food Commission
Commission des Oligoéléments dans l'Alimentation

1957–1962 *President:* J. F. Reith, Prof., Toxicologie van de Rejksuniversiteit, Catharjinesingel 60, Utrecht (Netherlands)

Members

1957–1962 A.R. Deschreider, Prof., Central Laboratory, Ministry of Economic Affairs, 23, rue Traversière, Brussels (Belgium)

1957–1962 J.C. Gage, Dr., I.C.I. Ltd., Industrial Hygiene Research Labs., The Frythe, Welwyn, Herts. (GB)

1958–1962 L. L. RAMSEY, Dr., Assistant Director, Division of Food, Food and Drug Administration, Washington 25, D.C. (USA)

1957–1962 L. TRUFFERT, Dr., Chef de Laboratoire, Laboratoire municipal, 39bis, rue de Dantzig, Paris-15e (France)

VI.1.2 Food Additives Commission
Commission des Additifs alimentaires

1957–1963 *President:* A.C. FRAZER, Prof., Dept. of Medical Biochemistry and Pharmacology, University of Birmingham, Birmingham 15 (GB)

Members

1957–1963 B. L. OSER, Dr., Food and Drugs Research Lab. Inc., Maurice Avenue at 58th Street, Maspeth 78, New York City (USA)

1957–1963 J. F. REITH, Prof., Toxicologie van de Reijksuniversiteit, Catharijnesingel, 60, Utrecht (Netherlands)

1957–1963 R. TRUHAUT, Prof., Faculté de Pharmacie, 4, av.de l'Observatoire .Paris-6e (France)

Two additional members to be appointed

VI.2 Fermentation Industries Division / Division de Fermentation

VI.2.1 Commission on Determination of Fusel Oils
Commission de Détermination des Huiles de Fusel

1957–1962 *President-Secretary:* L. GENEVOIS, Prof., Université de Bordeaux, 351, cours de la Libération, Talence, Gironde (France)

1961–1965 *Honorary Secretary:* H. SUOMALAINEN, Dr., Alko, Itämerenkatu 51, Helsinki (Finland)

Members

1961–1963 J. GUYMON, Prof., Dept. of Viticulture and Enology, University of California, Davis, Calif. (USA)

1961–1963 C. TARANTOLA, Prof., Stazione enologica sperimentale, Asti (Italy)

Associate Members

B. BACHMANN, Dr., Politechnika, Ul. Wolczanska 171, Łodź (Poland)

E.V. BELL, Dr., Distillers Co., Ltd., Great Burgh, Epsom, Surrey (GB)

B. DREWS, Prof., Institut für Gärungsgewerbe, Seestrasse 13, Berlin N65 (Germany)

F. PARISI, Dr., Distilleria Italiana, Via Chiaravalle 9, Milan (Italy)

VI.2.2 Commission on Characterization and Evaluation of Dried Yeast

Commission de Caractérisation et d'Evaluation de Levures séchées

1961–1963 *President:* R.F. LIGHT, Standard Brands Inc., 625, Madison Avenue, New York 22, N.Y. (USA)

1961–1963 *Vice-President:* C.N. FREY, Dr., 45 Cambridge Road, Scarsdale, N.Y. (USA)

1961–1963 *Hon. Secretary:* H. SUOMALAINEN, Dr., Alko, Itämerenkatu 51, Helsinki (Finland)

Members

1961–1963 P. BIROLAUD, Dr., Syndicat des Producteurs de Levure, Aliment de France, 2, rue de l'Oratoire, Paris-1er (France)
1961–1963 G. BUTSCHEK, Dr. Ing., Schatzmeisterstrasse 47, Hamburg, Wandsbeck (Germany)
1961–1963 J.M. KLOKGIETERS, Mr., Drift 61, Doorn (Netherlands)

Associate Members

J. DE CLERCK, Prof., 9, rue de l'Ecluse, Louvain (Belgium)
W.F.J. CUTHBERTSON, Dr., Glaxo Laboratories Ltd., Greenford, Middlesex (GB)
H. JØRGENSEN, Prof., The Royal Danish Technical University, 14, Odensegade, Copenhagen (Denmark)
H. LUNDIN, Prof., Division of Food Chemistry, Royal Institute of Technology, Stockholm 70 (Sweden)
F. MENDLIK, Dr., European Brewery Convention, P.O.Box 455, Rotterdam (Netherlands)
A. SZILVINYI, Prof., Versuchsanstalt für das Gärungsgewerbe in Wien, Michelerstrasse 25, Wien XVIII (Austria)

VI.3 Oils and Fats Division / Division des Matières grasses

1961–1965 *President:* G. WOLFF, Dr., 180, faubourg St-Denis, Paris-10e (France)

1961–1965 *Vice-President:* H. A. BOEKENOOGEN, Dr., Riouwstraat 122, Den Haag (Netherlands)

1961–1965 *Secretary:* J. E. BERTRAND, 158, av. Voltaire, Bruxelles 3 (Belgium)

Members

1961–1965 J. ERRBOE, c/o Aarhus Oliefabrik, Aarhus (Denmark)
1961–1965 J. GRACIAN-TOUS, Dr., Rodrigo Caro 17, Sevilla (Spain)
1961–1965 G. G. HALPIN, c/o The Irish Oil & Cake Mills, Ltd., Marsh Road, Drogheda (Ireland)
1961–1965 J. HOLMBERG, Dr., Forsknings Laboratoriet LKB, Postfack 14, Appelviken (Sweden)
1961–1965 G. JACINI, Prof., Via G. Colombo, 79, Milan (Italy)

Associate Member

W.D. Raymond, Tropical Products Institute, 56/62 Gray's Inn Road, London W.C.1 (GB)

National Representatives / Représentants nationaux

Argentina: Cattaneo, Prof., c/o Institut Argentino de Racionalización des Materiales, Chiel, N° 1192, Buenos Aires
Loew, Dr., c/o Instituto Argentino de Racionalización des Materiales, Chiel, N° 1192, Buenos Aires

Austria: G. Gorbach, Prof., Schlögelgasse 9, Graz
F. Stitz, Dr. Ing., Walterstr. 15/11, Linz, Donau

Belgium: E.L. Delvaux, Prof., 27, av. L.-Darte, Heverle/Louvain
M. Loncin, Prof., C.E.R.I.A., Anderlecht, 1, avenue E.-Gryson, Bruxelles 7

Czechoslovakia: M. Malenicky, Severoceske Tukové, Zàvody, Karla IV 305, Usti n./Lab.
J. Pokorny, Ing., Technikà, 1905, Praha 6 Dejvice
V. Vesely, Prof., Krondlova 14, Brno

Denmark: J. Errboe, c/o Aarhus Oliefabrik, Aarhus
S.B. Lintz-Christensen, c/o Dansk Sojakagefabrik A.S., 24 Islands Brygge, København/S
C. Skibsted Larsen, c/o Margarine Co. M.C. A.S., Otto Monsteds Plads 9, Copenhagen

France: P. Desnuelle, Prof., c/o Faculté des Sciences, place V.-Hugo, Marseille
J. Vizern, 222, av. du Prado, Marseille

Germany: J. Baltes, Dr., Hagenau 50, Hamburg 22
A. Heesch, Dr., Nassauer Allee 19a, Kleve/NDHR

Great Britain: W.V. Lee, The British Oil & Cake Mills Ltd., Albion Wharf, Erith, Kent
E. Lewkowitsch, Mme, 71 Priory Road, London N.W.6
K.A. Williams, Dr., 161–165 Roseberry Avenue, London E.C.1

Ireland: V.C. Barry, Dr., Kensington House, 67, Garville Avenue, Rathgar-Dublin
V.E. Davidson, c/o Clover Meats Ltd., Waterford
G. Halpin, c/o The Irish Oil & Cake Mills, Drogheda

Italy: S. Anselmi, Prof., Istituto superiore di Sanità, Viale Regina Elena 299, Rome
G. Balestrini, Dr., Via Tamburini 12, Milan
G. Jacini, Prof., Via G. Colombo 79, Milan

Netherlands: F. Hoeke, Dr., Yzerstraat 2, Rotterdam
H.J. Vos, Oranje Nassaulaan 29, Bilthoven

Spain: J. Gracian-Tous, Rodrigo Caro 17, Sevilla
J. Martinez-Moreno, Prof., Instituto de la Grasa, 4, avenida Heliopolis, Sevilla
J. Ranedo, Espalter 15, Madrid

Sweden: J. Holmberg, Dr., Forskningslaboratoriet LKB, Postfack 14, Appelviken
E. Olin, Ing., AB Karlshamns Oljefabriker, Karlshamn
G. Wode, Dr., Margarinbolaget AB, Nyängsvägen, 155, Bromma

Switzerland: A. Bosshard, Dr., c/o Plüss-Staufer AG, Oftringen
H. K. Sturm, Dr., Steinfels Ltd., Zürich
G. Weder, Laboratoire fédéral d'Essais de Matériaux, Unterstrasse 11, St-Gall

USA: N. Embree, Dr., Distillation Products Industries, Rochester 3, N.Y.
T. H. Hopper, Southern Regional Research Laboratory, New Orleans 19, La.
F. D. Snell, 25 W. 15th Street, New York 11

VI.4 Water, Sewage and Industrial Wastes Division
Division des Eaux d'Egout et des Eaux industrielles résiduaires

1959–1963 *President:* B. A. Southgate, Dr., Water Pollution Research Laboratory, Elder Way, Stevenage, Hertfordshire (GB)

1959–1963 *Secretary:* R. Colas, Association française pour l'Etude des Eaux, 7, rue du Cirque, Paris-8e (France)

Members

1959–1963 J. K. Baars, Prof., Research Institute of Public Health Engineering, Coenstraat 13, The Hague (Netherlands)
1959–1963 H. Lundin, Prof., Royal Institute of Technology, Division of Food Chemistry, Stockholm 70 (Sweden)
1961–1963 B. Visintin, Prof., Istituto superiore di Sanità, Viale Regina Elena 299, Rome (Italy)

Three additional members to be appointed

VI.5 Toxicology and Industrial Hygiene Division
Division de Toxicologie et d'Hygiène industrielle

1961–1963 *President:* J. C. Gage, Dr., Industrial Hygiene Research Laboratories, Imperial Chemical Industries Limited, The Frythe, Welwyn, Herts. (GB)

1961–1963 *Secretary:* C. Boudène, Prof., Université de Paris, Faculté de Pharmacie, 4, av. de l'Observatoire, Paris-6e (France)

Members

1961–1963 H. B. Elkins, Dr., Massachusetts Department of Labour and Industries, Division of Occupational Hygiene, 286 Congress Street, Boston 10, Mass. (USA)
1961–1963 T. Kitagawa, Prof., Yokohama National University, Faculty of Engineering, Ohka-Machi, Minami-ku, Yokohama (Japan)
1961–1963 W. Pietrulla, Dr., Institut für Wasser-, Boden- und Lufthygiene, Berlin-Lichterfelde, Unter den Eichen 82/84 (Germany)
1959–1963 V. Vašák, Dr., Ústav Hygieny Práce a Chorob z Provolání, Karlovo Nam 33, Prague 11 (Czechoslovakia)
1959–1963 R. T. Williams, Prof., Dept. of Biochemistry, St. Mary's Hospital Medical School, Paddington, London W.2 (GB)
1959–1963 N. Zurlo, Dr., Università di Milano, Via San Barnaba 8, Milan (Italy)

Associate Members

G. A. Hunold, Prof., Bundesgesundheitsamt, Institut für Wasser-, Boden- und Lufthygiene, Berlin-Lichterfelde, Corrensplatz 1 (Germany)

L. Silverman, Prof., Harvard University School of Public Health, 55, Shattuck Street, Boston 15, Mass. (USA)

R. Truhaut, Prof., Université de Paris, Faculté de Pharmacie, 4, av. de l'Observatoire, Paris-6e (France)

VI.6 Pesticides Division / Division des Pesticides

1960–1964 *President:* R. A. E. Galley, Dr., c/o Shell Research Ltd., Woodstock Agricultural Research Centre, Sittingbourne, Kent (GB)

1960–1964 *Secretary:* J. Treboux, Dr., J. R. Geigy AG, Basle (Switzerland)

Members

1961–1963 M. E. Alessandrini, Miss, Prof., Pesticides Laboratories, Istituto superiore di Sanità, Viale Regina Elena 299, Rome (Italy)

1961–1963 Z. Eckstein, Dr., Ecole Polytechnique, Koszykowa 75, Warsaw 10 (Poland)

1961–1963 H. Hurtig, Dr., Canada Department of Agriculture, Research Branch, Central Experimental Farm, Ottawa (Canada)

1961–1963 R. Takahashi, Prof., Nippon Kayaku Co. Ltd., 6, Marunouchi 1-chome, Chiyodaku, Tokyo (Japan)

VI.7 Plastics and High Polymers Division
Division des Plastiques et Produits de haute Polymérisation

1961–1963 *President:* G. Dring, Bakelite Limited, 12–18 Grosvenor Gardens, London S.W.1 (GB)

1961–1963 *Vice-President:* G. M. Kline, Dr., National Bureau of Standards, Washington 25, D.C. (USA)

1961–1965 *Secretary:* A. F. McKay, Dr., Monsanto Canada Limited, 425 St. Patrick Street, La Salle, Quebec (Canada)

Members

1959–1963 J. W. Bredt, Dr., Ulvenhoutschelaan 15, Breda (Ginneken) (Netherlands)

1959–1963 I. Franta, Prof. Ing., Technical University of Prague, Prague 6, (Czechoslovakia)

1959–1963 K. H. Hellwege, Prof., Director, Deutsches Kunststoff-Institut, Schlossgartenstrasse 6R, Darmstadt (Germany)

One member (USSR) to be appointed

Delegate Members

P. Dubois, Dr., Centre d'Etude des Matières plastiques, 21, rue Pinel, Paris-13e (France)

A. G. Nasini, Prof., Istituto chimico dell'Università, Corso Massimo d'Azeglio 48, Torino (Italy)

G. Natta, Prof., Istituto di Chimica industriale del Politechnico, Piazza Leonardo da Vinci 32, Milan (Italy)

National Representatives

Australia: L. GRUEN, Dr., Technical Director, Monsanto Chemicals (Austria) Ltd., Somerville Road, West Footscray, Victoria

Austria: R. REICHHERZER, Prof., Leiter des Kunststoffinstitutes im Chemischen Forschungsinstitut der Wirtschaft Österreichs, Wien III, Arsenal, Objekt 212
J. SCHURZ, Prof., Institut für physikalische Chemie der Universität Graz, Halbärthgasse 5, Graz

Belgium: M. GHOSEZ, Directeur des Recherches de Fabelta S.A., 18, chaussée de Charleroi, Bruxelles
M. RODEYNS, Ingénieur principal à la direction des Matières plastiques de la Société Solvay & Cie, 33, rue Prince-Albert, Bruxelles

Brazil: C.E. NABUCO DE ARAUJO, Jr., Dr., Caixa Postal 970, Rio de Janeiro
W. ZATTAR, Dr., Esso Brasileira de Petróleo S.A., Caixa Postal 1163, Rio de Janeiro G.B.

Canada: B. B. HILLARY, Dr., Dow Chemical of Canada Limited, Sarnia, Ontario

Czechoslovakia: K. BARTON, Research Institute for Protection of Materials, Prague

France: F. ECOCHARD, Dr., Chef du service physicochimique, Rhodiaceta, rue du Tunel, Lyon, Rhone

Germany: R. GÄTH, Dr., Badische Anilin- und Sodafabrik AG, Ludwigshafen/Rhein
O. LEUCHS, Dr., Hacketahl Draht- und Kabelwerke AG, Hannover 1

Great Britain: J. W. BARRETT, Dr., Monsanto Chemicals Ltd., Monsanto House, 10–18 Victoria Street, London S.W.1
J. J. P. STAUDINGER, Dr., Technical Director, Distillers Plastics Group, Devonshire House, Piccadilly, London W.1

Hungary: Z. CSÜRÖS, Prof., Head of the Dept. for Organic Technology, Technical University, Gellért rakpart 3, Budapest XI
G. HARDY, Prof., Director of the Research Institute of the Plastics Industries, Hungaria körut 114, Budapest XIV

Israel: H. FEILCHENFELD, Dr., Petrochemical Research Laboratory, Hebrew University, Jerusalem
D. VOFSI, Dr., Plastics and High Polymers Laboratories, Weizmann Institute of Science, Rehovoth

Italy: G. SACCENTI, Dr. Eng., Montecatini-Soc., Milan

Japan: H. SOBUE, Prof., Faculty of Engineering, University of Tokyo, Tokyo

Netherlands: J. HEIJBOER, Ir., Kunststoffen Instituut, Postbox 71, Delft

Poland: A. BORYNIEC, Prof., Ecole Polytechnique, Łodź
T. WISNIEWSKI, Institute of Plastics, Ul. Łacznósci 8, Warsaw 32

Spain: J. Y. Molero, Dr., Director of the Plastics Department, Patronato "Juan de la Cierva" de Investigación Técnica, Madrid 6
L. M. Vicente, Dr., Director of the Division of Standardization, Patronato "Juan de la Cierva" de Investigación Técnica, Madrid 6

Sweden: B. Berndtsson, Director of Research, Svenska Oljeslageri AB, Gothenburg
H. Högberg, Dr., Research Laboratory, Telefon AB L. M. Ericsson, Stockholm

Switzerland: K. Frey, Dr., Ciba Ltd., Basel
G. de Senarclens, Dr., Director, Schweiz. Isola-Werke, Breitenbach SO

E. Stirnemann, Dr., Lonza Elektrizitätswerke und Chemische Fabriken AG, Basel

United States: R. Boyer, Dr., Director of Plastic Research, The Dow Chemical Co., Midland, Michigan

USSR: M. S. Akutin, Dr., Plastics Institute, State Chemistry Committee, Moscow
S. N. Nametkin, Dr., Institute for Petrochemical Syntheses, Moscow

VI.8 Organic Coatings Division
Division des Revêtements de Surface

1959–1963 *President:* L. A. Jordan, Dr., Oakhill Drive, Langley Road, Surbiton, Surrey (GB)

1960–1964 *Vice-President:* K. Hamann, Prof., Forschungsinstitut für Pigmente und Lacke, Wiederholdstrasse 10, Stuttgart N (Germany)

1959–1963 *Secretary:* H. K. Raaschou Nielsen, Lak- og Farveindustriens Forskingslaboratorium, Odensegade 14, Copenhagen Ø (Denmark)

Members

1961–1963 B. Andersson, Dr., AB Wilh. Becker, Stockholm 9 (Sweden)
1961–1963 A. Cailliez, Laboratoire professionnel I.V.P., 14, rue Simonis, Bruxelles (Belgium)
1959–1963 M. Glaser, Midland Industrial Finishes Co., Waukegan, Ill. (USA)
1961–1963 J. A. W. van Laar, Dr., N.V. Philips' Gloeilampenfabrieken, Eindhoven (Netherlands)
1961–1963 A. Nasini, Prof., Istituto chimico dell'Università, Corso M. d'Azeglio 48, Torino (Italy)

Delegate Members

G. Balbi, Dr., Corso Matteotti 10, Milano, (Italy)
A. V. Blom, Dr., Monti della Trinità sopra Locarno (Switzerland)
R. Bult, Dr., Verf-Instituut T.N.O., Postbox 49, Delft (Netherlands)
S. Medina Castellanos, Dr., General Mola 47, Madrid (Spain)
B. Cyriax, Dr., Badische Anilin- und Sodafabrik, Ludwigshafen am Rhein (Germany)

G. Dechaux, Astral Celluco, 3, rue Keppler, Paris (France)
P. Fink-Jensen, A/S Sadolin & Holmblad, Holmbladsgade 70, Copenhagen S (Denmark)
P. J. Gay, Hangers Paint Ltd., Stoneferry Works, Hull (GB)
G. Gorbach, Prof., Institut für biochemische Technologie, Lebensmittel und Mikrochemie, Technische Hochschule Graz, Schlögelgasse 9, Graz (Austria)
R. Haug, Dr., Forschungsinstitut für Pigmente und Lacke, Wiederholdstrasse 10, Stuttgart N (Germany)
L. R. Hickson, c/o Messrs. Hadfields (Merton) Ltd., Mitcham, Surrey (GB)
M. Hochweber, Dr., Eidg. Materialprüfungs- und Versuchsanstalt, Leonhardstrasse 27, Zürich (Switzerland)
M. Huss, Fil. lic., Färg- och Fernissindustriens Forskningslaboratorium, Drottning Kristinas Väg 45, Stockholm (Sweden)
G. Jacini, Prof., Stazione sperimentale per Industrie degli Olii e dei Grassi, Via G. Colombo 79, Milan (Italy)
J. S. Long, Dr., University of Kentucky, Louisville, Kentucky (USA)
J. D. von Mikusch, Dr., Hauptlaboratorium Margarine-Union AG, Harburger Schlossstrasse 20, Hamburg-Harburg 1 (Germany)
W. J. Nijveld, Dr., Bond voor Materialenkentnis, Sectie: Nederlandse Vereniging voor Verftechniek, Oostzijde, Zaandam (Netherlands)
K. M. Oesterle, Dr., Goldbacherstrasse 88, Küsnacht ZH (Switzerland)
E. Oostens, 48, av. Jean-de-Boulogne, Bruxelles 2 (Belgium)
J. Petit, Dr., Directeur, Laboratoire de Recherches sur les Peintures et Vernis, 1, place A.-Briand, Bellevue, S.-et-O. (France)
J.J. Raaff, Dr., Verf-Instituut T.N.O., Postbox 49, Delft (Netherlands)
H. Rabaté, 26, rue d'Aumale, Paris-9e (France)
H. W. Talen, Dr., Verf-Instituut T.N.O., Postbox 49, Delft (Netherlands)
K. H. Ulbrich, Dr. Ing., Zinkweiss-Forschungsgesellschaft mbH, Oberhausen, Rheinland (Germany)
D. Wapler, Dr., Bundesanstalt für Materialprüfung, Unter den Eichen 87, Berlin/Dahlem (Germany)

VI.9 Pulp, Paper and Board Division
Division de la Pâte, du Papier et du Carton

1959–1963 *President:* W. Gallay, Dr., The E. B. Eddy Company, Hull, P.Q. (Canada)

1959–1963 *Secretary:* K. Ward, Jr., Dr., The Institute of Paper Chemistry, P.O. Box 498, Appleton, Wisc. (USA)

Members

1959–1963 G. Centola, Prof., Director, Stazione sperimentale per la Cellulosa, Carta e Fibre tessili vegetali artificiali, Piazza Leonardo da Vinci 26, Milan (Italy)

1961–1963 J. Chedin, Dr., Director General of the National Institute of Applied Chemical Research, 12, quai Henri-IV, Paris-4e (France)

1959–1963 G. JAYME, Prof., Institute for Cellulose Chemistry, Alexandrastrasse 24, Darmstadt (Germany)
1959–1963 W. JENSEN, Prof., Finnish Pulp and Paper Research Institute, P.O. Box 136, Helsinki (Finland)
1959–1963 H. F. RANCE, Dr., Wiggins Teape Group Research Organization, Butler's Court, Beaconsfield, Bucks. (GB)
1959–1963 K. WILSON, Miss, Chairman, I.C.C.A. Commission, Skoghallsverken, Skoghall (Sweden)

VI.9.1 Cellulose Analysis Commission
Commission de l'Analyse de la Cellulose

President: Miss K. WILSON, Skoghallsverken, Skoghall (Sweden)

ORGANIZATIONS OUT OF SECTIONS
ORGANISATIONS HORS SECTIONS

Tables of Constants / Tables de Constantes

Honorary President: E. Briner, Prof., 22, bd des Philosophes, Genève (Suisse)

President: C. Haenny, Prof., 19, rue César-Roux, Lab. de chimie-physique et recherches nucléaires de l'Université, Lausanne (Suisse)

Members: Sir Christopher Ingold, Prof., University College, Gower Street, London W.C.1 (GB)
T. Iredale, Reader of Chemistry, University of Sydney (Australie)
G.M. Pantchenkov, Prof., Université de Moscou (URSS)
F.D. Rossini, Prof., University of Notre Dame, Notre Dame, Indiana (USA)
R.G. Bates, Dr., National Bureau of Standards, Washington 25, D.C. (USA)
R. Wurmser, Prof., Institut de Biologie physico-chimique, 13, rue Pierre-Curie, Paris-5e (France)
J. Wyart, Prof., 18, rue Pierre-Curie, Paris-5e (France)

National Delegates / Délégués nationaux

Belgium L. De Brouckère (Mlle), Prof., Université libre de Bruxelles
Bulgaria G. Nadjakov, Prof., Académie des Sciences, Sofia
Canada E.W.R. Steacie, National Research Council, Ottawa
Czechoslovakia J.H. Krepelka, Prof., Université Charles, Na Slupi, Prague II
Denmark S. Veibel, Prof., Université technique du Danemark, Copenhague
France P. Aigrain, Prof., Ecole normale supérieure, Paris-5e
Greece T. Karantassis, Prof., Faculté des Sciences, 85, rue Pipinou, Athènes
India S. Bhagavantam, Dr., Indian Institute of Science, Bangalore 12
Italy G.B. Bonino, Prof., Istituto Chimico Ciamician, Via Selmi 2, Bologne
Japan S. Mizushima, Prof., Faculté des Sciences, Tokyo
Netherlands J. Coops, Dr., University, Laressestraat 174, Amsterdam
Poland W. Kemula, Prof., Zaklad Chemii Nieorganicznej Universytet, Waweska 17, Warsaw 22
Republic of South Africa P.C. Carman, Dr., National Chemical Laboratory, P.O.B. 395, Pretoria
Rumania I.G. Murgulescu, Prof., Centrul de Cercetari Chimice al Academiei R.P.R., Splaiul Independentei 89, Bucaresti
Spain T. Batuecas, Prof., University of Santiago de Compostela
Sweden L.G. Sillén, Prof., Royal Institute of Technology, Stockholm 70
USSR B.V. Nekrassov, Prof., University of Moscow

Steering Committee of the Tables of Constants
Comité de Direction des Tables de Constantes

European Center / Centre européen: 18, rue Pierre-Curie, Paris-5e

President: P. Aigrain, Prof., Ecole normale supérieure, Paris

Secretary General: H.G. Amat, Prof., Faculté des Sciences, Paris

Treasurer: F. Trombe, Prof., Laboratoires de Bellevue, Seine-et-Oise

Members: J. Benard, Prof., Faculté des Sciences, Paris
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M. Letort, Prof., c/o Cerchar, Paris
A. Maréchal, Prof., Institut d'Optique, Paris
P. Rumpf, Prof., Laboratoires de Bellevue, Seine-et-Oise
H.W. Thompson, Dr., FRS, St. John's College, Oxford (GB)

American Center / Centre américain: National Research Council Committee on Critical Tables

President: A.V. Astin, Dr., National Bureau of Standards, Washington, 25 D.C.

Representatives: Representing the NRC Division of Chemistry and Chemical Technology:
F.D. Rossini, Prof., University of Notre Dame, Notre Dame, Indiana (USA)

Representing the NRC Division of Earth Sciences:
F. Birch, Prof., Harvard University, Cambridge, Mass.
Representing the NRC Division of Engineering and Industrial Research:
F.B. Llewellyn, Dr., Bell Telephone Laboratories Inc., New York

Representing the NRC Division of Physical Sciences:
R.B. Brode, Prof., University of California, Berkeley

PRESIDENT'S REPORT ON THE GENERAL STATE OF THE UNION

for the period from 1957 to 1959, in conformity with Article 8 of the Union's Statutes

The officers of any organization are responsible to the members of the organization and must report to them at stated intervals. The President of the International Union of Pure and Applied Chemistry must make such a report at each Conference of the Union, that is at least every two years.

In starting this report it may be well to remind ourselves of the nature of the membership of the Union. The great scientific societies of the world are composed of people, although there may be provision for industrial or corporation memberships. These latter are usually devices for increasing income, and the privileges pertaining to such memberships mainly consist of high dues, some subscriptions to journals, and they have nothing to do with honor or right to vote.

In a true sense individuals are members of the International Union of Pure and Applied Chemistry because people serve as officers, they serve on committees, commissions, and divisions. They determine policy since policy could not form in a vacuum. In a legal sense, however, countries and not persons form the membership of the Union. The Statutes recognize that some countries are more important, chemically speaking, than others and that some can and should pay greater annual contributions to the support of the Union than others.

There is, however, a practical distinction between the form of the Union and the forms of the United Nations and of its specialized agencies. In UN bodies financial responsibility is calculated by a complicated formula so that those nations able to pay the most actually do pay the most. In spite of the obvious necessity of obtaining more money from the affluent nations than from the poorer nations, each nation whether great or small has one vote in a General Assembly or a Conference. Only in bodies such as the Security Council or Governing Boards is there any recognition that the large nations exert more influence than small ones. Nevertheless in certain very important policy matters the voices of the small nations make themselves felt.

The International Union of Pure and Applied Chemistry is based upon a compromise. The scale of payments which became effective 1 January, 1961, varies from $450 per year to $10,000 per year, that is by more than twenty-two fold. The votes in the Council, however, vary only from two to six, a factor of three. The officers of the Union may express off-the-record chagrin and displeasure if a nation desires to be in a low category and to pay less than it should, but the nations effectively determine their categories and their contributions.

Times change and science is growing rapidly. Not only is the amount of research as measured by publication expanding at an enormous rate, but the investment in chemical industry, the number of chemists, and the breadths of their interests are growing so that the future is indeed hard to foretell. Of one thing we may be sure: the growth has neither stopped nor slowed. Health, standards of living, conquest of outer space, archeology and atomic energy, to mention only a few matters, all depend on chemistry. The future will find chemists everywhere and the Union must adapt itself to changing and expanding subject matter as well as to a new geographical distribution of chemists.

We do not have very good figures on the present numbers of chemists in Asia, in the Middle East, in Africa, and in Latin America. Indeed our

knowledge on these matters in some countries in Europe may leave much to be desired. From a personal standpoint I can express both my gratification and my astonishment at the figures brought to our attention when some new country applies for membership in the Union. We should do more, I am sure, to cultivate the friendship and the loyalty of chemists everywhere.

The present geographical distribution of the membership of the Union, the votes on the Council, the composition of the Bureau, and of the Executive Committee are given in the following tables.

The dominant role played by the countries of Western Europe is well illustrated by the data in Table I. Indeed when it was started in 1919, IUPAC was mainly an association of the chemists of Western Europe with only minor help from other parts of the world. Between the two great wars one Conference (1926) was held in North America (Washington) and two were held in Eastern Europe (1925 Bucharest, 1927 Warsaw). The others were all held in Western Europe. During this same period all Congresses were held in Europe. Indeed young chemists outside of Europe knew little or nothing about the Union and were not interested in it. They scarcely knew that reports on atomic weights, nomenclature, and related subjects emanated from the Union. The same faces appeared again and again at meetings.

Table I—Composition of the Council of IUPAC

Geographical region	Number of countries	Fraction	Council votes	Fraction
Western Europe	16	0.44	68	0.50
Eastern Europe	7	0.19	22	0.16
North America	2	0.06	12	0.09
Asia	3	0.08	12	0.09
Middle East	3	0.08	6	0.04
Latin America	3	0.08	8	0.06
Africa	1	0.03	4	0.03
Australia	1	0.03	4	0.03
Totals	36	0.99	136	1.00

If the Union from 1919 to 1939 performed necessary functions and even if, as someone said, a Union for chemistry would have had to be created if this one had not existed, it may nevertheless be said quite truthfully that the vast majority of the chemists of the world scarcely knew of its existence. Those who did know about it often had the feeling that it was dominated by a small clique from a few countries.

At the end of a war there is a period of idealistic internationalism. The close of World War I saw the formation of the League of Nations, the International Council of Scientific Unions, several international unions and of a host of other international bodies. This is followed by a period of realism. The League of Nations was weak and died, the International Council of Scientific Unions persisted only thanks to the unselfish devotion of its Secretary General, some scientific unions died, and others became bodies with little influence.

The close of World War II saw the formation of the United Nations and of its specialized agencies including UNESCO, a revival of the International Council of Scientific Unions and of several scientific unions, and the formation of new unions. If unions were necessary before World War II they are much more necessary today. Problems of symbols, nomenclature, and constants are of increasing importance if we are not to degenerate into a Tower of Babel so that chemists of one part of the world will not be able

to understand the work of those from another. Nations are more dependent on each other for raw materials. The space age, nuclear power, and public health demand international co-operation on an increasing scale. A resurgence of scientific nationalism must not be tolerated.

Is IUPAC organized for the future? Are the chemists of the world aware of the functions the Union performs? Are they represented in an effective way by the Union? Much progress has been made but much remains to be done.

The distribution of votes in the Council as shown in Table I bears little relationship either to numbers of chemists or to the importance of chemical industry. Still less does it bear much relationship to geographical area or to the importance various parts of the world will have in the years to come. There is some difficulty in defining a chemist. In deciding whether representation is reasonable should one count research chemists or all chemists? By almost any way of counting there would seem to be more chemists in the countries of North America than there are in Western Europe. On the basis of total population most of the World is underrepresented except Western Europe.

The situation is not serious provided the various parts of the world feel that they have a voice in policy. There is some reason for worry in this respect. We should examine the composition of the Bureau to obtain information on the main policy determining body. The Bureau consists of 22 persons. Of these, 8 are ex officio; six are presidents of sections and are chosen by the sections; two are past presidents. Thus there are 14 persons to be elected by the Council. Of these 14 persons, one is the Secretary General and one is the Honorary Treasurer. These two persons must be chosen for their competence to perform essential functions for the Union. Inevitably political considerations will enter into the choice of the Secretary General and the Honorary Treasurer, but as far as possible political considerations should be secondary to competence. In any organization where membership covers a large geographical area, the quality of the secretariat will determine to a large extent the effectiveness of the organization. This does not mean necessarily that all policy decisions will be made within the secretariat, but inevitably day to day operations will mold policy to a very large extent.

The six section presidents will be chosen for their worth in the fields they represent. For the time being they will come almost exclusively from Western Europe and North America. The only two living past presidents are from Western Europe. Thus of the 8 ex officio members 8 are from Western Europe at present.

Table II gives the distribution of the entire Bureau and the distribution of the 12 persons (other than Secretary General and Honorary Treasurer) elected by the Council.

Table II—Geographical distribution of the Bureau

Geographical region	Number of members	Fraction	Number of elected members	Fraction
Western Europe	17	0.77	7	0.58
Eastern Europe	2	0.09	2	0.17
North America	2	0.09	2	0.17
Asia	1	0.05	1	0.08
Middle East	0	0	0	0
Latin America	0	0	0	0
Africa	0		0	0
Australia	0	0	0	0
Totals	22	1.00	12	1.00

Table III gives similar information for the Executive Committee

Table III—Geographical distribution of the Executive Committee

Geographical region	Number of persons	Fraction	Number of elected members	Fraction
Western Europe	5	0.71	3	0.60
Eastern Europe	1	0.14	1	0.20
North America	1	0.14	1	0.20
Asia	0	0	0	0
Middle East	0	0	0	0
Latin America	0	0	0	0
Africa	0	0	0	0
Australia	0	0	0	0
Totals	7	0.99	5	1.00

It is quite evident that Western Europe has an unduly high representation on policy making bodies. Indeed the Executive Committee (which was established after World War II) consisted entirely of Western Europeans until 1955.

At this point the nature of the presidency must be discussed. At the present time the President is elected for four years, and while there is no specific rule which prevents his reelection, it is generally understood that he will serve for only four years. The presidency should be an honor which is conferred on persons of distinction who have served the Union well over a period of years in lesser office. Usually it would be inadvisable to elect as a President a man who had not had experience in Union affairs. It is suggested, therefore, that the term of office of the President be shortened from four years to two years but that one of the Vice-Presidents (perhaps the only Vice President) should be considered to be President-elect for two years with the understanding that he would assume automatically the office of President. The President-elect, the President and the immediate past President should all be members of the Executive Committee.

It is highly advisable for the presidency to be rotated among various countries throughout the world. Up to the present time two presidents have been chosen from the United States, but all others were from countries of Western Europe. Very shortly we must give consideration to presidents who may reside in Asia, in the Middle East, in Africa, in Australia and in Latin America. Quite naturally the travel of the President and the expense of running his office are important items so that the change in the presidency should be accompanied by adequate financial resources to permit the President to travel and not to bear considerable expense out of his personal income.

Before we leave the question of the geographical distribution of the Bureau and of the Executive Committee some definite recommendations must be made. It must be recognized that the ex officio members will come mainly from Western Europe and North America. So also for the time being will the Honorary Treasurer, the Secretary General, the President and the Vice-President who is President-elect. Of the remaining ten persons to be elected by the Council a minimum of three should be chosen from other than Western Europe and North America. Preferably not more than five should be chosen from Western Europe. Moreover no two of these persons should be from the same country. Thus the distribution of the Bureau would be temporarily as follows:

President: Probably Western Europe or North America until 1967

Vice-President to be designated as President-elect: Probably Western Europe until 1965

Secretary General: Western Europe

Honorary Treasurer: Western Europe

Ex officio members: 8 mainly from Western Europe and North America

Elected Members: 2 minimum from Eastern Europe and 2 from North America (to be correspondingly reduced if the President, the President-elect, or one of the past Presidents comes from these regions). Preferably three from Western Europe and three from outside of Western Europe, Eastern Europe, and North America.

These are only suggestions. Of course it is important also to consider factors other than geographical distribution.

We must now review history since 1959 and look into the future.

The Information Bulletin was started by the Secretary General as a means of keeping officers, commission members, and national adhering bodies informed about the Union. It has been an outstanding success and has served its purpose well. More should be printed and it should be more widely distributed. The number printed now reaches 2500 for each issue. The number might well be 10,000 and it should be the real House Organ of the Union. We suggest that national adhering bodies purchase additional copies for distribution in their countries. It is the best way to advertise the Union that we can imagine.

September 1960 witnessed the appearance of the first issue of the new Journal of Pure and Applied Chemistry. The former Committee on Publications, and particularly its Chairman Dr. H. W. THOMPSON, deserve much credit and thanks from the Union for carrying forward the difficult negotiations which culminated in this new Journal.

A word must be said about the character of the new journal. It neither accepts voluntary contributions nor solicits contributions. Its purpose is to publish papers given at symposia, colloquia, and congresses sponsored by IUPAC. To be successful, therefore, the Editor and the Editorial Committee must have the privilege of deciding whether or not they wish papers given at such sponsored meetings to appear in the new journal. Obviously not all of them either could or should appear in the Journal of Pure and Applied Chemistry. Some may not be worthy of publication for scientific reasons. Others may have subject matter deemed more appropriate for other journals. The success of the new journal will depend on complete co-operation from the organizers of meetings and on its side prompt release must be ensured for manuscripts not desired for the new journal.

It would be inappropriate to give details of the contract between the Union and Butterworths. Suffice it to say IUPAC may derive some revenue from the new Journal but the amount will depend on the number of subscribers. We hope all chemists and particularly the national adhering bodies will urge libraries, universities, industries, and individuals to place subscriptions for the Journal of Pure and Applied Chemistry.

The detailed activities of the various Sections must be described in the reports made by the Section Presidents. Since the fundamental work of the Union is done within the Sections, it is my opinion that each Section President should give a brief verbal report at the Council meeting. The Section Presidents are chosen by their colleagues to represent specialized scientific interests. More and more the scientific activities should be handled by the sections with a minimum of interference from the officers and the Bureau.

Indeed the Bureau should expect the Section Presidents to meet at least once a year so that the Bureau and the Council may have the benefit of their advice on policy matters.

The matter of section autonomy is intimately related to finances. We intend to refer to this question later but one aspect of the problem must be mentioned here. The income of the Union is very restricted and the Executive Committee continually faces the problem of distributing very limited resources in a fair and just way. Reserve funds scarcely exist. It is necessary, therefore, for the sections to operate within fixed budgets, properly approved. Unfortunately this must be done item by item and a saving on one item may not be promised for another without proper approval by the Honorary Treasurer and the Secretary General. This is so because unexpected expenditures always arise and the officers of the Union must always determine whether a given expenditure is justified.

With this rather annoying budgetary restriction the Sections should be given a great deal of freedom. To utilize this freedom they must have functioning secretariats. Unfortunately once more there is a serious financial limitation on what can be spent for secretarial help and for travel.

Now a few generalizations about sections. The distinction between 'pure' and 'applied' chemistry has always been vague. In a general way, however, the applied chemists including the chemical engineers have not found much of interest in IUPAC. There are, of course, some notable exceptions to this broad statement.

It seems evident that an increased orientation toward applied chemistry is inevitable. First standards for international commerce, international relationships for air and water pollution, industrial toxicology, not to mention our traditional domains of nomenclature, symbols, units, and constants all are of increasing importance in the applied field. Chemical industry will expand everywhere and some of the new countries will ask for help on these important matters. Where chemistry is involved, IUPAC must be prepared to offer advice, to send representatives to other international bodies, and indeed to keep itself informed enough to know when it must offer its services in the interest of the advancement of chemistry.

Thus there is a whole area which has only been dimly outlined in the past and for which a new and more appropriate structure is necessary. For this money is required but fortunately we believe that if the proper organizational steps are taken money can be found.

Some persons are worried that the Applied Chemistry Section may overshadow the others. This is not a cause for worry. Probably more than eighty percent of the chemists of the world are applied chemists. This is inevitable and probably desirable. These applied chemists almost universally realize that long range progress depends on "pure" chemistry.

Thus we should recognize and encourage a considerable growth of the Applied Chemistry Section even possibly eventually to permitting it to develop its own means of financing. Probably the most urgent step is the formation of a secretariat which can handle the heavy burden which will surely be placed on it.

A few events of great significance must be cited for the other sections.

Since time immemorial the chemical atomic weights have been based on a scale such that the atomic weight of ordinary oxygen was taken as exactly 16.000 . . . It was not until the late 1920's that oxygen was proved by GIAUQUE and his collaborators to have more than one isotope. Since the isotopic ratio varied from one part of the world to another chemical atomic weights became slightly indefinite and the physicists who deal mainly with weights of single isotopes chose oxygen-16 as exactly 16.000 . . . This led to confusion and it became imperative for physicists and chemists to co-

operate in establishing a mutually satisfactory Atomic Weight Scale. The discussions reached a stage of much bitterness at times but eventually it was shown that by taking the atomic weight of carbon-12 as exactly 12.0000... one could at the same time provide the physicists with a single isotope as a standard and provide a minimum and generally insignificant change in chemical atomic weights. The latter was essential for reasons of trade. Indeed some laws are based on chemical atomic weights.

We are happy to say that the International Union of Pure and Applied Physics and the International Union of Pure and Applied Chemistry have both agreed to accept the atomic weight of carbon-12 as exactly 12.0000... as the basis for all atomic weights. This is indeed a milestone in the history of chemistry and physics and our most sincere thanks go to all those who participated in these difficult negotiations but particularly to the officers past and present of our Section of Inorganic Chemistry.

Probably no commissions of IUPAC work harder than the nomenclature commissions. After long deliberations and many formalities the reports on inorganic and organic nomenclature have been approved and published, first in book form by Butterworths and then, sometimes after translation, in some of the most widely read chemical journals in the world. All in all well over 30,000 copies of these rules have been printed, and they may be purchased for reasonable prices in many places.

It would be hard to name publicly all of the people who deserve credit for the outstanding success of the nomenclature work but certainly we must not fail to single out Professor VERKADE who has been interested in organic nomenclature for many years.

The question of symbols for physical chemistry and particularly for those quantities of interest to physicists and engineers has been a very difficult one. Friendships have been made and lost on this subject. Indeed in the same university one may find professors using different symbols for the same things.

While we do not pretend that all problems of physico-chemical symbols have been solved, progress has been made and a report has been published both by Butterworths and in several scientific journals. Our thanks go again to the officers and commission members of the Section of Physical Chemistry.

It would be impossible as well as inappropriate in a brief presidential address to list all of the significant reports which have appeared under the auspices of the Union. I hope no one will feel slighted if I stop at this point.

The officers of the Union have long been aware that the activities of the Union must be extended geographically. In the spring of 1959 the Executive Committee met in Moscow and in May 1960 the entire Bureau met in Leningrad and then traveled to Moscow as guests of the Academy of Sciences of the USSR. Our sincere thanks are extended to our Russian colleagues for their cordial hospitality. During the late summer of 1960 a symposium on Natural Products was held in Australia. This was a great success. IUPAC was represented officially by Professor STOLL as a past president and the Section of Organic Chemistry was represented by its President, Professor ERDTMAN.

A Symposium on Spectroscopy is to be held in Japan in 1962 and probably the Executive Committee will meet there. Possibly a meeting of the Executive Committee will be held in the near future in India. These attempts to sponsor meetings and to hold committee meetings outside of Western Europe and North America are a beginning, but they are not enough. The Executive Committee inevitably consists mainly of older men. We must devise means of sending active scientific workers and of holding meetings of sections and commissions everywhere. The chemists of all countries must feel that IUPAC is interested in them. This means that money must be found.

The new scale of national contributions was approved at Munich in August 1959 subject to further study and approval by the Bureau. This approval has been given and the new scale took effect on 1 January, 1961. It is still too early to tell what the total income will be for IUPAC. It may reach about $70,000 including a small subvention from UNESCO through the International Council of Scientific Unions. For 1961 because of the Montreal meetings a budget of well over $100,000 has been approved. To go further and hold meetings in Asia, in the Middle East, in Africa, in Australia, in Latin America and in Eastern Europe as we must eventually do, means a large increase in income. We are talking about several hundred thousand dollars.

Not only must meetings be geographically widely distributed, but the entire organization must be strengthened to meet future needs. We must mention the great devotion of the Secretary General. He performs his functions with great zeal and at great personal sacrifice. We owe him a great debt. Also the cost of the secretariat is borne to a large extent by companies in Basle and the finances are ably handled by the Union Bank of Switzerland. To all of them goes a sincere expression of gratitude.

But personal and unrewarded service has its limits as well as its limitations. As the Union gets larger and the load becomes heavier, there must be a secretariat properly supported on a business-like basis. We must make plans for the future and definite recommendations must be prepared for action. We request that the Council permit the Bureau to prepare a program for the future with a view to definite action at the Council meeting in 1963.

Finally I must mention the Honorary Treasurer who has performed his duties with exceptional fidelity.

It has been a real pleasure to work with all members of the Bureau and of the Executive Committee.

W. A. Noyes, Jr., President

BIENNIAL REPORT OF THE HONORARY TREASURER 1959–1960

(1) *Introduction*

The well-established tradition of presenting a Biennial Treasurer's Report and of discussing the figures every two years is convenient, as this period includes a Conference year and a non-Conference year—that is, a year with greater expenditures and a year with smaller expenditures. It should be well understood, however, that a balance sheet is produced every year.

At the 1959 Conference it was reported that IUPAC was in a state of transformation both from the point of view of activity and also of finances, and as a result of the decision made by the Council in 1959 we have made first attempts towards a fair provision of expenses for titular members. These attempts, together with the increased activity, both spread over two years, have already had financial consequences which are shown in a **deficit** of more than **$15000**.

(2) *Income*

(a) *UNESCO/ICSU Indirect Income*

The downward trend of the indirect income from UNESCO through ICSU channels has continued, as shown:

Year	Income from ICSU $
1955	18 439
1956	16 500
1957	15 500
1958	15 000
1959	15 000
1960	11 000

(b) *The Union's Direct Income*

The Finance Committee appointed by the Council in 1959 and presided over by Professor A. Tiselius, Past-President of IUPAC, made most valuable proposals which were approved in principle by the Council in Munich. Amongst other things, it was suggested that the essential part of any scheme to enlarge the income of the Union would be a substantial increase in the annual subscriptions of member countries, and it was recommended that the Council should consider a scheme involving an increase in the number of categories of membership.

However, the Council resolved that for 1960 the national subventions should be maintained at the same amount as decided in Stockholm in 1953 i.e.:

Category A	$ 1300
Category B	$ 800
Category C	$ 450

In view of the Finance Committee's suggestion, however, a few countries, e.g. Germany and the United Kingdom, have already voluntarily increased their annual subventions. Also individual chemists in the USA have continued to contribute towards the payment of the increased expenses of IUPAC. The total income from the national bodies was:

1957	$ 23 312.28	1959	$ 27 256.15
1958	$ 27 918.20	1960	$ 34 188.98

Once again there are only negligible amounts of arrears and this item will soon disappear altogether. Venezuela, who for many years did not pay its subventions has withdrawn from membership and Council must take an appropriate resolution. The arrears have been written off.

The development of the item *Interest and Dividends* is shown below:

1955	1956	1957	1958	1959	1960
$	$	$	$	$	$
1741	2983	4120	5315	4921.33	6528.46

The last item of income, sales of publications by the Secretary General, shows a downward trend which was expected in the light of the new agreement with the Union's publishers.

The total income from all sources was as follows:

Direct income

1959	$ 32 418.28	
1960	$ 41 410.02	
Total	$ 73 828.30	

ICSU Subventions

1959	$ 15 000 + 1522.47	= 16 522.47
1960	$ 11 000 + 344.20*	= 11 344.20
	Total	$ 27 866.67

Grand total for two years .	$101 694.97

* Including reimbursement from Deutsche Bunsengesellschaft.
(ICSU money is accounted for annually to ICSU.)

(3) *Expenditure*

(a) *Travel*

In a scientific international body whose main aim is the organization of permanent co-operation between the chemical societies of the member countries and the co-ordination of their scientific and technical activities (see Statutes), travel is the most important factor likely to contribute to its success. Travel must therefore be regarded as the most important item of IUPAC expenditure.

The decision taken in 1959 by the Council i.e.:

"(i) to remove the ceiling of $400

(ii) to pay as large a part of the tourist return air fare as the Executive Committee may decide is warranted by the Union's finances

(iii) to pay all subsistence allowances at a rate fixed by the Executive Committee

(iv) to request the Finance Committee to make proposals for provision of necessary finances for the sums mentioned above

(v) to have appropriate reserves in order to safeguard the Union's activities in case of emergency

(vi) that notwithstanding the great expenses involved, the Bureau should be convened every year for a meeting because closer contact and closer co-operation is necessary"

was reflected in increased expenditure on travel in 1960.

In the interests of economy Sections, Divisions and Commissions have been frequently requested to reduce as far as possible the number of titular members who are entitled to reimbursement of travel and subsistence

allowances. The response to this request was in most cases favourable. On the other hand, Sections, Divisions and Commissions have also been requested to establish a better geographical distribution of titular members. It is well known that, until recently, most IUPAC meetings were concentrated in Western Europe. The extension of its activity to other continents, and especially over the Atlantic, had serious financial consequences which exceeded by far the economies made by reducing the number of titular members.

Speaking as Treasurer, the reduction in the total number of titular members as an economy measure *only* is to be welcomed and will be advantageous to the Union's finances. However, it should be remembered that such a reduction will also have as a consequence a corresponding reduction of interest in the Union. Also many of the smaller countries will no longer be in a position to have at least one titular member. This is particularly true of the Applied Section.

(b) *Publications*

Cost of Publications

1953	1954	1955	1956	1957	1958	1959	1960
$	$	$	$	$	$	$	$
5743	2933	139	7652	2915	8065	4128.69	10162.69

(c) *Administrative Costs*

As in previous years the expenditure on administration is very low and credit must be given to the honorary officers, without whose work, so freely given, the costs of running the Union would necessarily be much higher. This applies particularly also to the Union Bank of Switzerland who do all the accounting and correspondence without any charge to the Union.

(d) *Costs for printing and mailing of the Information Bulletin*

As decided by the Council and following the recommendation of the Editorial Board, the Secretary General was charged with continuing to print and mail the Information Bulletin. Also it was decided that the preliminary, projected recommendations should be printed in the Information Bulletin and only the final rules must be incorporated into the Journal. The costs for printing and mailing of the Information Bulletin were $ 3143.— and $2679.— in 1959 and 1960 respectively.

(e) *Investments and Taxation*

Most of the investments held by IUPAC are British stocks. Repeated reminders were sent from the tax office. In 1959 $942.31 had to be paid to the United Kingdom, and since January 1960 additional tax payments have had to be made. A decision must be taken by the Bureau and Council as to whether increased taxation by the United Kingdom must be accepted or whether the investments should be transferred to another country, more convenient for IUPAC, at least as regards taxation.

Advice has been taken from bankers and solicitors who say that there would be no particular advantage in changing our investments or our domicile.

(f) *Symposia*

The greatly increased expenses for 1960 (a non-Conference year) were mainly for Symposia in Australia and Edinburgh. These were very successful, but the financial consequences of such activities must not be disregarded.

(4) *Balance Sheet*

The income and expenditure account for 1959/60 shows **overspending** to the extent of **$15427.44.** The total income was $101694.97 and the expenditure $117122.41. The balance sheet on 31 December, 1960, is given below. Only total figures are provided in this account in order to save time and space but if any member wishes to receive further details he is invited to ask for them.

The income and expenditure account has been audited by a company of Chartered Auditors whose report is appended. This has been done in spite of the idea expressed in the report for 1957/58 because some members have felt that only a commercial auditor can be expected to make a proper audit and that the extra expenses were justified.

(5) *Investments*

The Executive Committee decided that as far as possible no change should be made in investments and this decision will have to be confirmed by Council as a general policy.

(6) *Budgeting*

The budget proposed for 1961 was printed in the Information Bulletin No. 12, a reprint of which is appended.

The budget for 1962 involves two main difficulties:

(a) a sum of some $25000 must be put aside in order to pay the short-term loan.

(b) that, in two sections, owing to elections, new officers will be responsible for the programme of activities. The budget for 1962 should therefore be regarded as a rough estimate (see Appendix). The final budget should be decided by the Council.

(7) *Financial outlook for the future*

As Treasurer, I must stress that such a deficit must not be allowed to occur again, in view of the great difficulties of other international organizations which have no reserves. Measures of avoiding this are reviewed later. If IUPAC were to arrive at this situation itself all activity would be prevented. The criticism has been levelled at IUPAC that unfair reserves have been accumulated. This must be officially denied because the stocks forming our reserves date partly from pre-war days and partly from subventions from those few member countries who paid their annual dues throughout the war when no activity of IUPAC was possible. It must also be stated that IUPAC reserves would have been used up were it not for the large amount of work carried out by voluntary officials without any reimbursement. It is therefore questionable whether anyone would be authorized to touch these reserves.

There still remain three very urgent matters for which no solution has yet been found:

(a) *Payment of full travel allowances*

It has always been felt that the limitation of travel allowances to the $400 ceiling for any one journey is a serious hardship for many Commission members. However, in spite of the Council's decision to remove this ceiling there will not be sufficient money available in 1961 to pay more than $400 as before.

(b) *Subsistence allowances*

The structure of IUPAC on the one hand and the increasing costs of living on the other hand will not allow us to continue our activities with any success unless full subsistence allowances can be paid to those who do the real work. Here again, shortage of money will not permit this.

(c) *Remuneration of Scientific and Clerical Activities*

Sections and many of the Divisions and Commissions must, sooner or later, be provided with appropriate clerical assistance.

In order to meet all these liabilities and to fulfil efficient and useful work it is no longer possible for the Union to operate on a limited income. As the *ad hoc* Finance Committee, appointed at the 1959 Conference, pointed out, apart from a general increase in annual dues other sources of income must be tapped. As regards the appeal to the member countries to increase their annual subventions voluntarily it must be acknowledged that a few countries have unselfishly increased them considerably. The annual dues should be adjusted according to the importance of chemistry in the country concerned, using the Unesco scale as a basis. Also, for those countries in which chemistry is of greater importance an additional contribution over and above the Unesco scale should be offerred. In those countries in which the national contribution is not appropriate to the expenses involved nor to the importance of chemistry in the national economy, it might be possible to achieve better results in the future by tightening our definition of a "National Body". Provision should be made in the Statutes to ensure that the national organizations are truly representative of chemistry, both in the Universities and in Industry, in the country concerned. This matter does not only concern financial considerations.

The Montreal Conference is a new experiment and it will be the second time only that a general conference has been held outside Western Europe. The extra costs involved could only be met by a short term loan—the annual dues are insufficient and moreover, are not usually paid until the end of the year.

(7) *Acknowledgments*

My first thanks must go to the National Bodies whose annual subventions are the backbone of our finances. Considerable savings resulted from the generous hospitality of the organizers of the 1959 Conference who paid travel and subsistence for those titular members who had been chosen by them to give General or Section Lectures.

I must also express my indebtedness to the Union Bank of Switzerland, particularly to Mr. G. Hanselmann, Miss L. Sommerhalder and Mr. H. Baumann, who have undertaken an immense amount of work for us without any charge to the Union.

Thanks are due also to my secretary, Mrs. E. Barron and to Mrs. T.C. Brabazon and Dr. D. C. Martin of the Royal Society.

REPORT ON ACCOUNTS NEUTRA TREUHAND AG, ZÜRICH

Accountants and Auditors

Years Ended 31 December, 1959 and 1960

Assets

	1959		*1960*	
Balances at bankers	$	$	$	$
Current accounts				
US $	372.77		4 027.74	
Sterling	1 097.27		3 132.01	
Swiss Francs	120.23		113.47	
Bankers acceptances in Sterling				
Ordinary account	98 427.16		18 787.31	
Capital account	—.—	100 017.43	75 180.20	101 24
*Investment at cost**		30 766.85		30 76
**Market value:* 1959 $65 194.64 1960 $56 949.03				
		130 784.28		132 00

Zurich, 31 January, 1961

Note: Rates of Exchange at 31 December, 1960, adopted for the purpose of above accounts:

Swiss Francs 4.3050 / US $ 1.— / Sterling £ 1.–.– / $ 2.8050

Liabilities and Surplus

	1959		1960	
ended balance of SCO Grants	$	$ —.—	$	$ —.—
ors		10.30		10.30
l account		—.—		102 139.36
es		63 144.45		28 420.16
itory liabilities		214.46		10 839.53
ulated balance	73 440.74		—.—	
ce of Income and Expenditure nt				
	6 025.67	67 415.07		9 401.77
		130 784.28		132 007.58

Income

	1959		1960	
Subscriptions	$	$	$	
1959/1960	26 358.75		33 638.98	
previous years	897.40	27 256.15	550.—	34
Interest and dividends		4 921.33		6
Sale of publications		167.50		
Profit on investments		73.30		
Difference of rates of exchange . . .		—.—		
		32 418.28		41
Balance (carried to balance sheet) .		6 025.67		9
		38 443.95		50
UNESCO Grants Account				
Unexpended balance of grants from previous years		—.—		
add: grants received during the year		16 522.47		11
		54 966.42		62
Note: Unpaid subscriptions		1 900.—		2

31 December, 1960

Expenditure

	1959		*1960*	
e expenses	$	$	$	$
ries for clerical assistance . . .	1 479.90		3 971.53	
ting, stationery and other ex-ses	2 270.72	3 750.62	14 748.76	18 720.29
vel and subsistence allowances .	41 602.52		23 268.10	
tribution to symposia	3 500.—		8 000.—	
lication	4 128.69		10 162.69	
	49 231.21		41 430.79	
: UNESCO Grants	16 522.47	32 708.74	11 344.20	30 086.59
r expenses				
k charges	109.55		84.56	
scription to ICSU	558.36		1 061.62	
es	942.31		641.78	
it and account charges	143.95	1 754.17	216.95	2 004.91
erence of rates of exchange . . .		230.42		—.—
		38 443.95		50 811.79
ESCO Grants Account				
enditures out of grants during year	17 687.02		20 476.—	
: IUPAC Funds (overdraft UNESCO a/c . . .	1 164.55	16 522.47	9 131.80	11 344.20
		54 966.42		62 155.99

ch, 31 January, 1961

Investments held at

British Government Securities
- 3% Savings Bonds 1955/65
- $3\frac{1}{2}$% War Stock Bearer

The English Electric Company Limited
- $4\frac{1}{2}$% Debenture Stock 1972/77
- Ordinary stock units of £ 1.-.-.

Pearl Assurance Company Limited
- Ordinary stock units of £ 0.5.-.

Royal Dutch Petroleum Company
- Ordinary shares of Fls 20 Bearer
- Ordinary shares of Fls 20 Admin. Certs.

The Shell Transport and Trading Co. Ltd.
- Ordinary stock units of £ 1.-.-, registered

Unilever N.V.
- Ordinary sub shares of Fls 12, registered

American Electric Power Co.
- Common stock shares of $ 10.—

E. I. Dupont de Nemours & Co.
- Common stock shares of $ 5.—

Johns Manville Corporation
- Common stock shares of $ 5.—

	Salaries for clerical assistance	
	$ 1959	$ 1960
Physical Chemistry Section	28.—	—.—
Inorganic Chemistry Section	500.—	—.—
Organic Chemistry Section	280.—	—.—
Biological Chemistry Section	—.—	—.—
Analytical Chemistry Section	—.—	—.—
Applied Chemistry Section	—.—	—.—
Executive Committee and Bureau	671.90	3 971.53
	1 479.90	3 971.53

31 December, 1960

		Cost $	Value 1960 $	Value 1959 $
£	2 800	6 849.94	7 068.60	7 193.20
£	1 450	4 145.09	2 389.50	2 628.85
£	100	273.73	225.10	247.10
Units	877	3 368.18	4 228.10	6 369.21
Units	224	3 481.72	4 790.94	5 096.—
Shs	180	2 667.86	5 806.35	8 253.—
Shs	3	—.—	96.77	
Units	467	3 424.58	8 514.58	10 419.95
Shs	546	2 048.05	13 018.—	14 045.85
Shs	84	1 402.46	4 842.65	4 163.25
Shs	15	1 462.49	2 816.57	4 036.49
Shs	55	1 642.75	3 151.87	2 741.74
		30 766.85	56 949.03	65 194.64

Printing, stationery and general office expenses		Travel- and subsistence allowance		General Total	
$ 1959	$ 1960	$ 1959	$ 1960	$ 1959	$ 1960
376.79	314.88	8 857.46	85.81	9 262.25	400.69
460.—	60.—	4 559.66	2 672.49	5 519.66	2 732.49
—.—	—.—	3 414.33	3 969.89	3 694.33	3 969.89
239.28	79.73	3 353.24	2 598.48	3 592.52	2 678.21
25.42	356.10	5 468.82	—.—	5 494.24	356.10
690.46	599.80	7 626.08	1 975.68	8 316.54	2 575.48
478.77	13 338.25	8 322.93	11 965.75	9 473.60	29 275.53
2 270.72	14 748.76	41 602.52	23 268.10	45 353.14	41 988.39

Unpaid Subscriptions as at 31 December, 1960

		US $
1960	Belgium . . .	800.—
	Colombia . .	450.—
	Turkey . . .	450.—
	Venezuela . .	450.—
		2150.—
Previous years:		
1959	Rumania . .	450.—
	Turkey . . .	450.—
	Venezuela . .	450.—
		1350.—
1958	Colombia . .	450.—
	Rumania . .	450.—
		900.—
1957	Rumania . .	450.—

We, hereby, certify that besides the assets listed in our balance sheet as at 31 December, 1960, we maintain with Union Bank of Switzerland, Zurich, a special account under the heading "sFr.-Separat-Konto", showing as at *31 December, 1960, a balance in our favour of sFr. 28 443.—*. The development of the aforementioned account during the past two years was as follows:

1959

Jan. 1	Fr. 17 384.50	balance brought forward as per statement of account
Jun. 23	+Fr. 63.—	interest accrued up to 30 June, 1959, as per statement of account
Jul. 21	+Fr. 10 765.60	check US $ 2500.—
Dec. 31	+Fr. 56.90	interest accrued up to 31 December, 1959, as per statement of account

1960

Jun. 30	+Fr. 86.50	interest accrued up to 30 June, 1960, as per statement of account
Dec. 31	+Fr. 86.50	interest accrued up to 31 December, 1960, as per statement of account
	Fr. 28 443.—	

Zurich, 31 December, 1960

Zürich, 24 February 1961

The Executive Committee International Union of Pure and Applied Chemistry, IUPAC Secretariat, Basle—Switzerland

Gentlemen:

In accordance with instructions received from your Treasurer, we have examined the balance sheet of International Union of Pure and Applied Chemistry as at 31 December, 1960, and the statements of income and expenditures for the two years ended 31 December, 1959 and 1960. We now have pleasure in submitting our report thereon, together with the following financial statements, partly prepared by us.

Exhibit I—Balance Sheet as at 31 December, 1960, expressed in US Dollars;

Exhibit II—Comparative Statement of Income and Expenditure for the twelve months ended 31 December, 1959 and 1960;

Schedule A—Statement of Marketable Securities owned as at 31 December, 1960.

Scope of Examination

The primary purpose of our examination was to enable us to furnish an opinion as to the fairness of the representations contained in the accompanying financial statements.

Our examination was made in accordance with generally accepted auditing standards and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

The financial statements for the year 1958 were examined by Treuhand-Vereinigung Aktiengesellschaft, Munich. We satisfied ourselves on the basis of the respective report that the balances as at 31 December, 1958, have been brought forward correctly to the 1959 accounts.

Bank balances were reconciled to the amounts confirmed by certificates and statements. Bankers acceptances and marketable securities owned were confirmed by bank deposit certificates.

Accounts payable and accrued liabilities were either computed or otherwise satisfactorily substantiated.

The Treasurer of your Union certified to us that all known liabilities of the corporation were recorded on the books at 31 December, 1960, and that there were no known contingent liabilities.

We have analysed and scrutinized the accounts included in the statements of income and expenditure for the two years ended 31 December, 1959 and 1960, to an extent considered appropriate by us. Expenses were evidenced by invoices, signed receipts and claim sheets, duly approved by the Section presidents or the Secretary General. We did not find any items requiring special comment. Our special examination of the expenditures in connection with UNESCO grants did comprise a complete check of all transactions throughout the period. We reported upon these investigations to the accountant of the International Council of Scientific Unions on 21 January, 1960 and 1961.

Accountants' Opinion

In our opinion, the accompanying balance sheet and related statements of income and expenditure fairly present, in accordance with generally accepted accounting principles, the financial position of the International Union of Pure and Applied Chemistry, at 31 December, 1960, and the results of its operations for the two years then ended.

NEUTRA TREUHAND AG, Accountants and Auditors

Comparative Statem
Years

(expr

Income

	1959		1960	
	$	$	$	$
Subscriptions				
Current year	26 358.75		33 638.98	
Previous years	897.40	27 256.15	550.—	34 1
Interest and dividends earned . . .		4 921.33		6 5
Sale of publications		167.50		4
Profit on investments		73.30		[illegible]
Exchange differences (net)		—.—		2
		32 418.28		41 4
Loss for period		6 025.67		9 4
		38 443.95		50 8
UNESCO Grants Account				
Unexpended balance of grants from previous years		—.—		[illegible]
Subventions collected during year .		16 522.47		11 3
		54 966.42		62 1

Exhibit II

ne and Expenditure
ecember, 1959 and 1960

ʒ Dollars)

Expenditure

	1959		*1960*	
: expenses	$	$	$	$
laries for clerical assistance . .	1 479.90		3 971.53	
inting, stationery and miscel-ıeous	2 270.72	3 750.62	14 748.76	18 720.29
el and subsistence allowances .	41 602.52		23 268.10	
·ibution to symposia	3 500.—		8 000.—	
ication	4 128.69		10 162.69	
	49 231.21		41 430.79	
Subventions collected from UNESCO (Grants)	16 522.47	32 708.74	11 344.20	30 086.59
· expenses				
nk charges	109.55		84.56	
bscription to ICSU	558.36		1 061.62	
xes	942.31		641.78	
ıdit and account charges . . .	143.95	1 754.17	216.95	2 004.91
ange differences (net)		230.42		—.—
		38 443.95		50 811.79
ʼSCO Grants Account				
ɜnditure out of grants during ar	17 687.02		20 476.—	
IUPAC Funds, overdraft UNESCO a/c . . .	1 164.55	16 522.47	9 131.80	11 344.20
		54 966.42		62.155.99

Statement of mark

Name of investment	Interest rate p.a.	Nun u
British Government Savings Bonds 1955/1965	3%	
British Government War Stock	$3\frac{1}{2}$%	
The English Electric Company Limited Debenture stock 1972/74	$4\frac{1}{2}$%	
Ordinary stock		
Pearl Assurance Company Limited Ordinary stock		
Royal Dutch Petroleum Company Ordinary stock		
The Shell Transport and Trading Co. Ltd. Ordinary shares, registered		
Unilever N.V. Ordinary sub shares, registered		
American Electric Power Co. Common stock shares		
E. I. Du Pont de Nemours & Co. Common stock shares		
Johns Manville Corporation Common stock shares		
Total		

* *Rate of exchange applied:* 1 English Pound = US$ 2,805

Balance Sheet as at
(expressed in

Assets	$
Cash in Banks	7 273.22
Bankers acceptances (Commercial bills)	93 967.51
Marketable securities—at cost (Schedule A) (Market value $56 949.03)	30 766.85
	132 007.58

Note: Subscriptions outstanding as at 31 December, 1960, aggregate $2150.—

rities owned
ecember 1960

Total per value	per unit	Market value as at 31 December 1960 total in £	in US $*	Book value (at original cost) in US $
2800.—	90%	2 520.—.—	7 068.60	6 849.94
1450.—	58¾%	851.17. 6	2 389.50	4 145.09
100.—	80¼%	80. 5.—	225.10	273.73
877.—	£ 34.4½%	1 507. 6.10	4 228.10	3 368.18
56.—	£ 7 5/8	1 708.—.—	4 790.94	3 481.72
3660.—	£ 11½	2 104.10.—	5 903.12	2 667.86
467.—	£ 6½	3 035.10.—	8 514.58	3 424.58
6552.—	£ 8½	4 641.—.—	13 018.—	2 048.05
840.—	$ 57 5/8	1 726. 8. 9	4 842.65	1 402.46
75.—	$ 187 11/16	1 004. 2. 6	2 816.57	1 462.49
275.—	$ 57 9/32	1 123.13. 3	3 151.87	1 642.75
		20 302.13.10	56 949.03	30 766.85

Exhibit I

31 December, 1960
US Dollars)

Liabilities and Net Worth	$	$
Accounts payable		10.30
Accrued liabilities		10 839.53
Net worth:		
Capital account	102 139.36	
Reserve	28 420.16	
	130 559.52	
Less: Loss for the twelve months ended 31 December, 1960	9 401.77	121 157.75
		132 007.58

BUDGET PROPOSED FOR 1961

At the recent meeting of the Executive Committee in Madrid, careful consideration was given to the budget of the Union. It was agreed that a tentative figure for 1961 of 115000 dollars should be expended, and it was the Executive Committee's final opinion that this was the extreme upper limit of expenditure. This figure was arrived at after careful consideration of the various sections' proposed expenses and it was left to the Honorary Treasurer and the Secretary General to try to fit in this figure in relation to the income of the Union.

If full travel and subsistence allowance is paid to all Titular members the total expenditure for the Conference year 1961 would amount to 211404 dollars. This figure is of course completely outside the range of the finances of the Union even under the most favourable conditions. The Honorary Treasurer and the Secretary General are faced with a very difficult problem and the following account of how they propose to deal with it is provided so that all members of the Union may appreciate the difficulties under which they are labouring:—

(1) Income. In 1961 the only certain money that will be available is 40000 dollars. However, in 1960 voluntary contributions were made over and above the standard ones by Germany and Great Britain, and to these must be added the individual contributions from chemists in the United States. If, in 1961, the same good fortune were to hold, this might increase the income by another 35000 dollars making 75000 dollars in all. It is, however, obvious that even under the most favourable circumstances it will be necessary to find another 40000 dollars. The Honorary Treasurer and the Secretary General have explored every possible method of raising the extra money and the following are their suggestions:

(i) The adoption of group travel. The Secretary General has found that for parties of 125, that is to say a Boeing aircraft full, the fares would be reduced to 60% of the economy rate. If this could be adopted, and 3 aircraft filled with IUPAC passengers, it would solve the problem by saving a sum in the region of 40000 dollars.

(ii) Adoption of the suggestion of the Finance Committee under the Chairmanship of Professor Tiselius, that voluntary contributions from other sources perhaps commercial, be explored to the full.

(iii) As a last resort the obtaining of funds by the realization of some of the Union's assets. Both the Honorary Treasurer and the Secretary General are loath to take this action except as a very last resort and it is felt that under no circumstances should more than 40000 dollars be provided in this manner and then only as a temporary measure.

(2) Expenditure. The Honorary Treasurer and the Secretary General herewith submit four tentative budgets; the first being a full budget with the largest figure of 211404 dollars based on full attendance and full travel and subsistence allowance for all Titular members. As we have already said, this is quite beyond the range of the capacity of the Union even under the most favourable circumstances.

The second figure is for 140039 dollars and is arrived at by assuming that there is a 400 dollar ceiling for travel and 150 dollars for subsistence.

If the most favourable circumstances occured, as already reviewed and assuming that only 80% attended, then this figure would be reduced to 120000 dollars and would come within the region of the figure suggested in Madrid, namely 115000 dollars.

The other two budgets are self-explanatory and might be forced upon us if the favourable circumstances assumed in the above did not materialize in 1961.

Revenue de l'IUPAC

	1960 $	*1961** $	*1962* $
Argentine	450	450	
Australie	800	800	
Autriche	450	450	
Belgique	800	1 300	2 600
Brésil	800	800	
Bulgarie	450	450	
Canada	1 300	2 600	
Chine (Taiwan)	800	800	
Colombie	450	450	
Tchécoslovaquie	800	800	
Danemark	800	1 600	
Finlande	450	450	
France	1 300	2 600	
Allemagne	5 000	5 000	
Grande-Bretagne**	2 600	10 000	
		+ 3 000	
Hongrie	450	450	
Inde	450	450	
Irlande	100	100	
Israel	800	800	
Italie	1 300	2 600	
Japon	1 300	2 600	
Luxembourg	100	100	
Hollande	800	2 600	
Norvège	800	800	
Pologne	800	800	
Portugal	450	450	
Roumanie	450	450	
Espagne	800	800	
Suède	1 300	2 600	
Suisse	1 300	2 600	
Afrique du Sud	800	800	
Turquie	450	450	
République arabe unie	450	450	
USA	3 800	10 000	
URSS	1 300	2 600	
Yougoslavie	450	450	
	35 700	64 500	
Subvention de l'ICSU	11 000	14 000	
Intérêts sur les investissements (cette somme sera vraisemblablement réduite de moitié si nous devons réaliser une partie de nos investissements)	5 000	2 500	
	51 700	81 000	

*Selon les réponses des pays membres confirmées officiellement au 21 novembre 1960.

**An additional donation of £3000 (approximately $8400) has been promised by the Royal Society.

Dépenses de l'IUPAC

Dépenses prévues pour 1961 au cas où tout le monde se réunirait à Montréal, mais auxquelles – comme souligné dans la déclaration du Trésorier et du Secrétaire général – il est impossible de faire face

	Voyage 100% et subsistance à tout le monde	
Section de Chimie physique	*$*	*$*
Comité de Section	5 562	
Commissions:		
Symboles et Terminologie physico-chimiques	5 509	
Thermodynamique chimique	9 221	
Electrochimie	3 467	
Chimie macromoléculaire	7 427	
Données et Etalons physico-chimiques	2 773	
Structure moléculaire et Spectroscopie	3 905	
Bulletin «Chemical Thermodynamics»	250	
Symposia:		
Chimie macromoléculaire/Plastiques	2 000	
Frais administratifs:	220	
Total	40 334	
Section de Chimie minérale		
Comité de Section	5 497	
Commissions:		
Poids atomiques	3 024	
Nomenclature	6 417	
Hautes Températures	4 431	
Géochimie	7 255	
Symposia:		
Hautes Températures	2 000	
Frais administratifs:	600	
Total	29 224	
Section de Chimie organique		
Comité de Section	5 161	
Commissions:		
Nomenclature	4 998	
Codification, Chiffrage et Triage des Combinaisons organiques	924	
Symposia:		
Chimie de Coordination – Detroit	2 000	
Frais administratifs:		
Total	13 083	

	$	$
Section de Chimie biologique		
Comité de Section*	3 150	
Commissions:		
Nomenclature	2 468	
Etalons de Protéines	2 334	
Chimie clinique	1 020	
*Seuls, les Président, Vice-Président et Secrétaire de la Section se réuniront à Montreal, tous les autres membres titulaires se rencontrant à Bruges (Belgique)		
Symposia:		
Frais administratifs:	500	
Total	9 472	
Section de Chimie analytique		
Comité de Section	6 998	
Commissions:		
Réactions analytiques	5 575	
Techniques microchimiques	5 403	
Nomenclature	2 368	
Données optiques	4 512	
Données électrochimiques	4 584	
Données d'Equilibre	3 116	
Symposia:		
Techniques microchimiques	2 000	
Frais administratifs:	1 500	
Total	36 056	
Section de Chimie appliquée		
Comité de Section*	5 491	
Divisions:		
Bromatologie**	1 932	
Eaux d'Egout et Eaux industrielles résiduaires**	1 062	
Pâte, Papier et Carton*	3 868	
Plastiques et Produits de haute Polymérisation*	3 772	
Pesticides*	5 873	
Revêtements de Surface**	2 036	
Toxicologie**	1 867	
Fermentation**	2 016	
Matières grasses**	1 322	
* Montréal – ** Europe		
Symposia:		
Pesticides	5 000	
Frais administratifs:	600	
Total	34 839	

	$	$
Frais de voyage et dépenses administratives – Président	1 160	
Frais de voyage Trésorier et dépenses administratives – Royal Society	1 244	
Frais de voyage – Secrétaire général	1 100	
Dépenses administratives – Secrétariat général		
assistantes salaires	5 300	
assistante anglaise salaire	3 000	
caisse pension assistantes	2 210	
matériel de bureau, stencils, etc.	2 620	
taxes postales	1 715	
télégrammes	85	
téléphones	100	
loyer des bureaux	930	
services techniques, impression	155	
photocopies	63	
traductions	465	16 643
Réunion du Bureau	15 659	
Réunion du Comité exécutif	1 557	
Réunion des Présidents de Section	400	
Comité de Rédaction	2 978	
Editeur scientifique	1 280	
Voyage Dr R. S. Cahn, USA	600	
Statuts	400	
Bulletin d'Information	2 775	
Frais minimum organisation Conférence Montréal	1 000	
Taxes Royaume-Uni	1 000	
2% Contribution à l'ICSU	600	
Butterworths	–	
Grand total	211 404	

Budget provisoire pour 1961

(établi après la réunion du Comité exécutif à Madrid – octobre 1960)

		Subsistance	
Section de Chimie physique	*150 $*	*100 $*	*50 $*
Comité de Section	5 180	4 730	4 280
Commissions:			
Symboles et Terminologie physico-chimiques	3 820	3 420	3 020
Thermodynamique chimique	7 740	7 190	6 640
Electrochimie	2 170	1 970	1 770
Chimie macromoléculaire	5 555	5 155	4 755
Données et Etalons physico-chimiques	1 760	1 610	1 460
Structure moléculaire et Spectroscopie	4 520	4 220	3 920
Bulletin «Chemical Thermodynamics»	250	250	250
Symposia:			
Chimie macromoléculaire/Plastiques	–	–	–
Frais administratifs:	220	220	220
Total	31 215	28 765	26 315
Section de Chimie minérale			
Comité de Section	4 810	4 360	3 910
Commissions:			
Poids atomiques	2 395	2 195	1 995
Nomenclature	–	–	–
Hautes Températures	3 530	3 230	2 930
Géochimie	–	–	–
Symposia:			
Hautes Températures	–	–	–
Frais administratifs:	600	600	600
Total	11 335	10 385	9 435
Section de Chimie organique			
Comité de Section	4 520	4 220	3 920
Commissions:			
Nomenclature	–	–	–
Codification, Chiffrage et Triage des Combinaisons organiques	–	–	–
Symposia:			
Chimie de Coordination	–	–	–
Frais administratifs:	–	–	–
Total	4 520	4 220	3 920

Section de Chimie biologique	*Subsistance*	*150 $*	*100 $*	*50 $*
Comité de Section *Commissions:* Nomenclature Etalons de Protéines Chimie clinique	*C'est au Président King à décider de l'attribution et de la répartition de cette somme	4 300*	3 700*	3 300
Symposia:				
Frais administratifs:		200	200	200
Total		4 500	3 900	3 500

Section de Chimie analytique			
Comité de Section	6 240	5 840	5 440
Commissions:			
Réactions analytiques	4 915	4 615	4 315
Techniques microchimiques	4 495	4 145	3 795
Nomenclature	–	–	–
Données optiques	2 515	2 265	2 015
Données électrochimiques	4 050	3 850	3 650
Données d'Equilibre	2 440	2 240	2 040
Symposia:			
Techniques microchimiques	–	–	–
Frais administratifs:	1 000	1 000	1 000
Total	25 655	23 955	22 255

Section de Chimie appliquée			
Comité de Section	5 125	4 675	4 225
Divisions:			
Bromatologie*	2 070	2 070	2 070
Eaux d'Egout et Eaux industrielles résiduaires*	1 315	1 315	1 315
Pâte, Papier et Carton	2 910	2 660	2 410
Plastiques et Produits de haute Polymérisation	3 410	3 110	2 710
Pesticides	4 860	4 510	4 160
Revêtements de Surface*	2 145	2 145	2 145
Toxicologie*	1 885	1 885	1 885
Fermentation	–	–	–
Matières grasses	–		–
*Réunion en Europe: 400$ frais de voyage et £ 10.– frais de séjour au maximum			
Symposia:			
Pesticides	–	–	–
Frais administratifs:	600	600	600
Total	24 320	22 970	21 520

Subsistance		*150 $*	*100 $*	*50 $*
Frais de voyage et dépenses administratives – Président		1 160	1 160	1 160
Frais de voyage Trésorier et dépenses administratives – Royal Société		1 244	1 244	1 244
Frais de voyage – Secrétaire général		1 100	1 100	1 100
Dépenses administratives – Secrétariat général				
assistantes salaires	5 300			
assistante anglaise salaire	3 000			
caisse pension assistantes	2 210			
matériel de bureau, stencils, etc.	2 620			
taxes postales	1 715			
télégrammes	85			
téléphones	100			
loyer des bureaux	930			
services techniques, impression	155			
photocopies	63			
traductions	465	16 643	16 643	16 643
Réunion du Bureau		6 290	5 690	5 090
Réunion du Comité exécutif		1 557	1 557	1 557
Réunion des Présidents de Section		400	400	400
Comité de Rédaction		2 475	2 225	1 975
Editeur scientifique		1 250	1 250	1 250
Voyage Dr R. S. CAHN, USA		600	600	600
Statuts		400	400	400
Bulletin d'Information		2 775	2 775	2 775
Frais minimum organisation Conférence Montreal		1 000	1 000	1 000
Taxes Royaume-Uni		1 000	1 000	1 000
2% Contribution à l'ICSU		600	600	600
Butterworths		–	–	–
Comptes Rendus		–	–	–
Grand Total		140 039	131 839	123 739



BUDGET PROPOSED FOR 1962

The Budget for 1962 must cover the ordinary expenses of 1962 and compensate for part of the deficit of 1961. It will be necessary to limit expenditure and to augment the revenue to such an extent that the financial year 1962 will end with an excess of at least $20000.

A. Revenue

The revenue in 1962 will probably be as follows:

	$
member countries	52 800
ICSU	14 000
dividends and interest	2 000
	68 800

B. Expenditure

(a) The fixed annual expenditure will be:

	$	$
Travel and administrative expenses—President		1 200
Travel Treasurer and administrative expenses—Royal Society		1 244
Travel—Secretary General		1 100
Administrative expenses—General Secretariat	$	
assistants, Salaries	5 300	
English assistant, Salary	3 000	
pension funds for assistant	2 210	
stationery, etc.	2 620	
postage	1 715	
cables	85	
telephone calls	100	
office premises	930	
technical services, printing	155	
photocopies	63	
translations	465	16 643
Bureau meeting		10 000
Executive Committee meeting (Japan)		9 291
Editorial Board		1 582
Scientific Editor		1 280
Butterworths		2 630
Comptes Rendus		6 000
Information Bulletin		2 775
Income Tax due in Great Britain		1 000
2% contribution to ICSU		600
(b) Partial reimbursement of loan		13 455
		68 800

C. Amount remaining at the disposal of the Sections

Nil.

REPORT OF THE AD HOC FINANCE COMMITTEE

The financial affairs of the Union are too complex to allow solution by an *ad hoc* committee which meets for a day or two. Indeed, we feel that the financial problems of the Union will *never* be settled, for the simple reason that the more money is available, the more projects the Union will wish to undertake. At this time, we wish only to call attention to some aspects of the Union's financial situation and to suggest actions which may be of benefit.

While the Union is in no immediate financial danger, the present arrangements are precarious ones, and steps should be taken to change them as quickly as possible. The generous support of Hoffmann-La Roche, Ciba, Geigy and Sandoz in supporting the office of the Secretary-General is deeply appreciated, and it is hoped that these companies will see fit to continue to support the activities of the Union in this way, but it should be realized that it may not always be possible for them to do so. Steps should be taken to guard against that contingency. This requires a guaranteed, continuous income.

The balance sheet of any organization can be improved in either of two ways—by spending less, or by taking in more. While we certainly wish to curtail expenses as much as possible, we realize that the expanding activities of the Union will demand an ever-increasing budget. Indeed, our first recommendation authorizes the Bureau to expend funds in a way in which our funds have not been used before. A few adhering bodies which are active members of the Union have no representation on either commissions or committees, so the benefits which they derive from Union membership are greatly reduced. The *ad hoc* Committee on Finance recommends that the Bureau be given authority to pay for travel and subsistence for one delegate from each of these bodies to Conferences of the Union.

In attempts to save money, the Committee has three recommendations:

First, in line with the suggestion made by Sir ALEXANDER TODD, we suggest that future conferences generally be held in Western Europe. When possible, these shall be held in conjunction with congresses, but there need not always be a connection between conferences and congresses, as the latter should be as widely distributed as possible. When a Congress is not held in conjunction with a conference, a symposium or a series of lectures, may be arranged for those who wish a scientific programme.

Second, the charter flight bringing delegates from Europe to Montreal for this meeting has shown that such flights are practical and can result in great savings to the Union. It is recommended that the Bureau be given authority to decide in connection with each conference whether charter flights should be arranged. If such arrangements are made, delegates would have the choice of using the charter flight or of receiving for transportation the equivalent of the charter flight fare.

Third, it is recommended that adhering bodies be asked to pay, or arrange for the payment of, the travel and subsistence of their titular members whenever possible. These payments are to be considered, as contributions to the Union.

As far as increased income is concerned, it is to be greatly hoped that a continuing source of funds can be developed which will obviate the necessity of having a year-to-year campaign. Only in this way can the Union be assured that it can carry out its long range plans. Income must be sought from a variety of sources in many parts of the world.

Some sources are:

(a) Contributions from Industry. If a programme of soliciting funds from industry is to be successful, details as to tax-exemptions, use of funds, and

specific purposes of the Union must be developed and properly presented. In view of the increasing importance and activity of our Section on Applied Chemistry, Boards of Directors of industrial companies should be asked to suggest ways in which the Union could be of increased usefulness. They will thus be led to understand the nature of the Union and its value to chemical industry.

Since the tax laws, the economic systems, and the customs of the countries which belong to the Union differ so widely, it does not seem possible to suggest a uniform plan of raising money in different countries. Rather, it is recommended that some person (or, perhaps two or three persons) be appointed in each country in an honorary capacity to devise more efficient and fruitful means of raising funds in that country, and to put such plans into effect. These national representatives shall keep in touch with each other, either directly or through the office of the Secretary-General for mutual aid and to generate friendly competition in the matter of contributions to the Union.

(b) Contributions from chemical societies. Since the work of the Union relieves the national societies of a great deal of work and expense, and since it benefits all chemists, the societies should be willing to support the Union financially.

(c) Contributions from governments or governmental units, at least for the support of certain activities of the Union. For example, departments of foreign affairs might be asked to pay travel and subsistence of the delegates of their respective countries to conferences.

(d) Bequests from philanthropic foundations and individuals.

Finally, the *ad hoc* Committee on Finance recommends that as occasion allows, its funds which are now invested in government bonds and other funds available for investments be reinvested in the stocks of stable companies which have interests in chemical work. It is our opinion that over a period of years, this will result in a substantially greater income.

Signed: J. C. Bailar, Chairman

REPORT OF THE EDITORIAL ADVISORY BOARD

Meetings were held at Montreal on 3 and 4 August, 1961.

Present: Dr. H. W. Thompson (GB, Chairman), Prof. W. A. Noyes jr. (USA), Sir Charles Dodds (GB), Dr. R. Morf (Switzerland), Dr. R. S. Cahn (GB), Dr. E. J. Crane (USA), Prof. W. Klemm (Germany), Dr. E. Klever (Germany), Prof. V. N. Kondratiev (USSR), Prof. M. Letort (France), Dr. L. Marion (Canada), Prof. A. Nasini (Italy), Sir Alexander Todd (GB), Prof. P. E. Verkade (Holland), Prof. B. C. L. Weedon (GB, *Scientific Editor*)

Dr. D.C. Martin (GB) attended by invitation, and Messrs. J. Whitlock and R. A. Watson of Butterworths Scientific Publications were present for discussion of certain items.

(1) The Chairman outlined progress since the foundation of the new Journal "Pure and Applied Chemistry". Two complete volumes had now been published and the first issue of volume three was expected to be available during the Montreal Congress. The only manuscripts in hand, namely the papers from the Ghent Symposium, some of those from the Amsterdam Symposium, and the Duyckaerts Commission report, had only recently been received, so that there was now no residual back log. This volume of publi-

cation (some 1800 pages) during the first year of the Journal had involved considerable effort by the publishers. Some serious delay had inevitably occurred at the start, but it should be noted that the contract was not signed until June 1960, and also there had been considerable editorial problems with some of the manuscripts supplied. A statement was provided of the current number of subscribers to the Journal and of the sales of reprints of specific articles, reports and symposia. It seemed likely that the earlier estimates of income to the Union in 1961 would be justified, and might provide a substantial contribution to cover other publications such as the Bulletin and Comptes rendus as well as royalty fees. It was felt, however, that in spite of extensive advertising by the publishers, especially to members listed in the Comptes rendus, more publicity was required, and some suggestions were made for this. It was decided to explore the possibility of an annual subscription to the Journal rather than by separate volume.

(2) A scheme was agreed for the distribution of complementary copies of the Journal received by the Secretary General.

(3) It was agreed that as regards the Commission or Division reports, 25 free copies provided under the contract with the publishers should be sent to the President of the Section or Division concerned for distribution at his discretion (e.g. to Commission members). As regards individual papers presented at Symposia, 25 free reprints would be sent to the author (or group of authors), of a given paper. Additional copies of reprints would be obtainable at preferential rates agreed between the publishers and the Editorial Advisory Board. It was decided that these decisions regarding reprints should apply to recent publications.

(4) In the light of experience gained during the past few years, it was decided to open discussions with the publishers regarding a revision of the contract made previously, and representatives of the publishers expressed their readiness to do so.

(5) The Board reaffirmed a previous decision by the Publications Committee and Executive Committee that nomenclature reports should be published in the original language only (any language, at the discretion of the President of the Section concerned, but normally English, French or German). However, at the request of the President of the Section concerned and with the approval of the Executive Committee, a translation of the whole or part of the report could also be published—in the latter event, the text should indicate which is the official version.

Reports comprising sections in various languages should be published as submitted, the languages used being normally English, French and German, but translations might be prepared at the discretion of the Editor.

Accounts of symposia should normally be in English, French or German. A suitable translation of a contribution in one of the less common languages should, if possible, be provided by the author or by the organizers of the Symposium.

A Commission or Section President desiring a translation should arrange for it to be made, without payment by IUPAC. If the Editor desires a translation he should request the Commission or Section President concerned to arrange it, and if this request is not met the Editor shall have power to arrange translation.

(6) After discussion it was decided that no honorarium can be paid to authors.

(7) The publishers agreed not to claim royalty payment for reprinting of the atomic weight tables by other parties, provided that appropriate ac-

knowledgment is made (i.e. "printed by permission of IUPAC and Butterworths Scientific Publications").

(8) The Biological Chemistry Section has issued *tentative* rules for Symbols, Abbreviations, etc. in the Information Bulletin during 1961, and wished (a) to have these recognized as *definitive* at the Montreal meeting, and (b) that they might be reprinted at once in the scientific journals. It was pointed out that (a) involved procedure contrary to the rules of IUPAC. Moreover Prof. VERKADE reported a decision by the Commission on Nomenclature of Organic Chemistry that the two-year delay imposed by the Statutes was scientifically desirable and he therefore opposed the request. Request (b) involved royalty payments to Butterworths. The Editor and Dr. CAHN were asked to discuss this matter with Butterworths.

(At these subsequent discussions the publishers agreed to claim no royalty for publication of these rules in scientific journals provided that they were labelled *tentative* rules and carried the customary acknowledgment to IUPAC and the publishers, and a formal letter to this effect has now been received. The publishers requested, though not as a condition, that journals publishing these rules should permit a half-page gratis advertisement for IUPAC publications. *Definitive* rules, now or later, should, however, be published in the Journal and be subject to royalty by agreement.)

(9) Dr. CRANE asked to have his view recorded that any royalty for atomic weight tables, nomenclature rules, and similar material was an evil, even if a necessary one.

(10) It was agreed to emphasize again in the Information Bulletin that applications for sponsorship of Symposia must be made to the Secretary General and accompanied by the details listed in Information Bulletin No. 11, and that the decision whether or not IUPAC is to publish the proceedings in whole or in part should be taken before sponsorship is granted.

It was agreed that in order to reach a decision on publication the Secretary General should consult the Chairman of the Editorial Advisory Board and the Editor as soon as the application for sponsorship is received. These three Officers may also seek such further information and opinion as they wish. The Chairman and Editor should then advise the Secretary General whether they recommend publication by IUPAC if sponsorship is eventually given. The final decision on sponsorship would be taken by the Executive Committee after receipt of this advice. The view was expressed that sponsorship should be given only after careful consideration, and with discretion.

(11) It was agreed that in the case of Symposia, in general only the main invited lectures would be published, but exceptions might be made for other lectures or papers in special cases. The Editor would have the power, after taking such advice as he considered necessary, to reject any material submitted for publication by IUPAC if it did not reach the desired scientific standard.

The Chairman and Editor agreed to draw up, for publication in the Information Bulletin and Journal, appropriate papers giving regulations governing IUPAC publications in general and also details regarding form and conventions for manuscripts, and these papers would be circulated to the Editorial Advisory Board.

(12) It was agreed that the day to day administration of the publication affairs should be conducted by the Chairman, Editor, and the Secretary General. It was further agreed that the Editor should have the power to enlist help in carrying out his duties, provided that any action of this type involving a charge to the Union of more than £100 should have the prior

approval of the Honorary Treasurer. Dr. CAHN was also co-opted to the above executive group for advice and assistance.

(13) It was decided that time should be allowed for further experience before a limit be set to the annual size of the Journal.

(14) Decisions on proposed future publications were made as follows:

(i) that the proceedings of the Brussels 1962 Symposium on Natural Products and the history of the Belgian Chemical Society should not be published by IUPAC;

(ii) that IUPAC would not be able to agree to the suggestion to publish the main invited lectures of the Stockholm 1962 Symposium on Coordinated Chemistry as a bound volume with the abstracts of the other papers, but would publish the main invited lectures as agreed earlier;

(iii) that the proposed third and fourth volume on Thermochemistry planned by the IUPAC Commission should be published by IUPAC;

(iv) that the "Bulletin of Thermodynamics and Thermochemistry" should not be published by IUPAC;

(v) that the 1961 papers of the Wood Symposium, the main lectures of the Macromolecular Chemistry Symposium and plenary lectures of the Montreal Congress should be published, and that a decision as to publication of other papers at the Montreal meeting be made by the Chairman, the Editor and Prof. MARION;

(vi) that the new edition of "Standard methods for analysis of oils and fats" to be supplied by the Applied Chemistry Section should be published by IUPAC;

(vii) that the proceedings of a Symposium on Information and Documentation (Milan 1961) should not be published by IUPAC.

(15) It was agreed that the Editorial Advisory Board should meet during the IUPAC Conference in London 1963, and the Executive Committee was asked to consider whether a meeting should be held in Brussels 1962.

(16) A vote of thanks was expressed to the Chairman, Editor and Dr. CAHN for their work for IUPAC publications.

H. W. THOMPSON

IUPAC PUBLICATIONS

Information concerning the publication policy of the International Union of Pure and Applied Chemistry has been given from time to time as it has developed during the last few years (see, for example, Information Bulletins Nos. 5, 7, 8, 9; Comptes Rendus de la XXᵉ Conférence; Pure and Applied Chemistry, Vol. 1, No. 1). The purpose of this report is to summarize the present position in the light of the discussions which were held during the Montreal Conference in August 1961.

The journal "Pure and Applied Chemistry", which was launched in September 1960, now constitutes the main medium for publishing and disseminating the scientific proceedings of the Union. The general policy of the Journal is laid down by the Editorial Advisory Board, and the interpretation of this policy in the day-to-day administration of publication affairs is left to the discretion of a small group comprised of the Chairman of the Editorial Advisory Board, the Scientific Editor, the Secretary General (IUPAC), and such other members of the Board as it is thought desirable to co-opt. All other members of the Board will, of course, be available for consultation as the need arises.

In special circumstances the publication of scientific material outside the Journal will also be undertaken. In addition, the Comptes Rendus and the Information Bulletin will continue to be published through the office of the Secretary General as in the past.

To reduce delays to a minimum it is essential that requests for publication should be made well before the submission of the manuscript. Division and Section Presidents are reminded that they are required to give the Editor ample notice of any reports from their Bodies, and to keep him informed as to the approximate length of the report and the probable date of submission. Organizers of Congresses and Symposia should note that the question whether or not the Union would publish the proceedings in whole or in part has to be settled before the Executive Committee take a final decision concerning sponsorship. Therefore, as specified in Information Bulletin No. 11, all applications to the Secretary General for sponsorship should include the following information:

- (i) Title of Congress or Symposium, with sub-divisions if any
- (ii) Section, Commission, or Division sponsoring meeting
- (iii) Proposed date and place
- (iv) Approximate number of participants expected
- (v) Number of papers to be presented, and approximate length
- (vi) Number of specially invited (plenary or sectional) lectures, if any, with provisional list of names
- (vii) Whether financial help from the Union is requested
- (viii) Details of the arrangements that are being made for the collection of manuscripts (e.g. by whom and by what date)
- (ix) Whether, in the event of the Union not wishing to publish the proceedings, the organizers wish to make other arrangements for publication

A Division, Section or Commission report will be published in the language(s) in which it is submitted, but in the interests of achieving maximum publicity, it should preferably be in English, French, or German. It is sometimes desirable that a translation of key sections of the text (e.g. the explanatory introduction, but not tables and notes which can readily be understood by most chemists in the original) should also be published. After consultation with the Editor, the Section, Division, or Commission President should, whenever possible, arrange for this translation to be prepared by a member of the Body concerned. Translation of Definitive Nomenclature Rules must have also the approval of the Division or Section President and of the Executive Committee. In all cases the published text must indicate which is the official version and which the translation.

The proceedings of meetings will normally be published in English, French, or German. A suitable translation of a contribution in another language should, if possible, be provided by the author(s) or the organizers of the meeting. If available, both the original text and the translation should be provided.

Of the contributions to sponsored meetings, only the main invited (plenary or sectional) lectures will normally be published. The Editorial Advisory Board, or those of its members authorized to act on its behalf, will, however, consider carefully any requests by organizers of meetings for departures from this general policy.

Twenty-five free reprints of all contributions to the Journal will be supplied by the Union's publishers. Those of Division or Commission Reports will be sent to the Section President for distribution at his discretion. The free reprints of individual contributions to symposia will be given to

the author, or shared between the authors if there is more than one. Extra copies of reprints of individual contributions may be purchased from the publishers. Bulk orders by authors, Union Officers, or organizers of meetings should be placed as early as possible, and not later than the date assigned for the return of proofs. Free copies of each issue of the journal will automatically be sent by the Secretary General to each National Adhering Body, members of the Executive Committee and the Editorial Advisory Board, Section Presidents, and to Unesco.

The question of reprinting of certain Union publications in other journals is now under review, and it is hoped to make a further announcement after discussions have been held with the publishers.

Fuller details concerning the procedure for the submission of material for publication, and for the preparation of manuscripts, will appear periodically in the Journal (cf. Vol. 4, No. 1).

Any comments or criticisms which will help the Editorial Advisory Board to further the aims of the Union's publications will be welcomed.

H. W. Thompson
B. C. L. Weedon

PROPOSAL CONCERNING THE SITES OF FUTURE CONFERENCES

It has been the traditional policy of the Union to meet every two years in an official conference involving the Council, Bureau, Section Committees and Commissions and, at least in recent years, these meetings have been associated with an International Congress. For a variety of reasons it will be clear that the location of these Congresses should range widely over the world; equally it is desirable that the Union as an international body should hold at least some of its meetings in widely separated parts of the world. The policy as outlined above has led to recurring financial crises in the Union's affairs and this situation will continue and is indeed likely to become more serious with the continuing growth of the Union's activities. Some measure of the financial problems may be gained from the fact that to hold a Conference of the Union at the present time in Montreal or in Moscow must involve an additional cost of $100 000 as compared with a corresponding meeting in Western Europe. Since these costs are made up essentially of travel and subsistence allowances for titular members it could reasonably be argued that the Union is being very extravagant. I believe it is possible for the Union to change its practice in such a way as to remove this criticism and at the same time operate more efficiently.

According to the Statutes the Bureau must meet once in each year and the Council (i.e. the General Conference of the Union) at least once every two years. But there is no requirement that the Conference be associated with a Congress nor is there any restriction as to the place where it is held. Nor is there any restriction on the location of Commission meetings.

I would therefore propose:

(1) That General Conferences of the Union be held for the time being in Western Europe and preferably in one place where the General Secretariat is located. In so far as possible meetings of Commissions occurring apart from the Conference should be held either in the same place or in such other location as will result in a lesser expenditure;

(2) that the biennial meeting of the Bureau and Executive Committee should be allowed to rotate geographically rather as the Conference rotates

at present. This would meet the point that some Union activity should clearly be held in a variety of locations in the world without the vast expenses of holding Conferences in various parts of the world.

Advantages other than purely financial would accrue from such changes. Secretarial assistance is a continual problem for Presidents of Sections and Commissions. This problem could be solved most economically by strengthening the Union's Secretariat. Meetings held where the Secretariat is located would then be properly serviced and all files, etc. would be directly available. I realize that changes of this nature would represent quite a break with tradition and would need to be carefully considered before action is taken. But I believe they warrant urgent attention so that if they seem desirable they could be adopted at the London Conference in 1963.

Sir Alexander Todd

DRAFT AGENDA FOR THE XXIst CONFERENCE

of the Bureau and Council Meetings in Montreal 2–5 August 1961

(1) Statutory Report of the President on the General State of the Union
(2) Adoption of the Comptes Rendus of the XXth Conference
(3) Ratification of the appointment of a Finance Committee
(4) Ratification of the appointment of a Drafting Committee
(5) Biennial Report of the Honorary Treasurer, comments of the Finance Committee
(6) Headquarters of IUPAC (see Chapt. I, art. 1, § 5 of the Statutes)
(7) Proposal of the British National Committee with regard to the interest of the chemical industry
(8) Adhering Bodies
(*a*) Approval of new Adhering Bodies, if any
(*b*) Approval of the change of category of certain Adhering Bodies
(9) Approval of the preliminary budget for 1962 and 1963
(10) Limitation of the number of titular members in Divisions and Commissions
(11) Ratification by the Bureau of the decisions taken by the Executive Committee
(12) Ratification by the Council of the decisions taken by the Bureau since the XXth Conference
(13) Adoption of the Section Presidents' Reports previously submitted to the Bureau and the Council in writing
(14) Minutes of the Section Presidents' meetings—London, 1960–1961
(15) Final decision regarding the new atomic weights scale
(16) Report by the ad hoc Committee appointed to describe the functions of the officers of the Union, of Sections, Divisions and Commissions (Prof. P. Verkade, Chairman)
(17) Problems regarding publications and report of the Editorial Board
(18) Recommendations concerning the fundamental units of mechanics—MKSA—CGS system
(19) Proposal of tentative nomenclature rules (Steroids, Abbreviations, etc.)
(20) Copyright and translation
(21) Rules regarding the election and term of office of the Union's officials and of the members of Commissions
(22) Problems regarding the Applied Chemistry Section
(23) Chemical Engineering
(24) Possible co-operation with WHO—"generic names"
(25) Possible co-operation with ISO
(26) Report of the Section Presidents on the results of the Conference
(27) Report of the Finance Committee
(28) Election of three Bureau members
Approval of the elections made by the Sections
(29) Meetings scheduled for 1962 and 1963
(30) Date and place of the XXIInd Conference and the XIXth Congress
(31) Programme and subjects of future Congresses (see resolution by the Section Presidents of 9th April, 1958)
(32) Affiliation of the Congress of Catalysis, the World Petroleum Congress, etc.
(33) Any other business

MINUTES OF THE COUNCIL MEETINGS

held in Montreal 2 and 5 August 1961

Present: President W. ALBERT NOYES, Jr., Bureau and delegates of adhering bodies (see pages 31–33). All formalities to enable the Council to make decisions had been fulfilled. Bureau members and adhering bodies had been reminded by the Secretary General's letter No. 5001 of 16 March, 1961, to submit suggestions for the Agenda. Invitations to attend the Council Meetings were sent by registered mail, four months before the Conference, as required by the Statutes. The President's Report, the Honorary Treasurer's Report and the Auditor's Report in English and French had been distributed to all adhering bodies, to the Bureau and to all delegates to the Council at their home addresses four months before the Conference. Adhering bodies, the Bureau and National Delegates had all been invited to make nominations to the new Bureau and to provide biographies of the candidates.

Minute 1 *Agenda*

Prof. NOYES, when opening the meeting, asked the Council to approve a change in the sequence of the items on the Agenda (following a recommendation of the Bureau) in order to fill the vacancy on the Executive Committee, Bureau and Editorial Board left by the resignation of Prof. B.A. KASANSKI.
Resolved: to approve this change in the sequence of the Agenda. (Passed unanimously as required by the Statutes.)

Minute 2 *Election of Prof. V.N. Kondratiev*

Resolved: that Prof. V.N. KONDRATIEV be elected to the Executive Committee, Bureau and Editorial Board. (Passed unanimously.)

Minute 3 *Election procedure*

The President asked the Council to decide which procedure should be used later on in the meeting for elections to the Bureau.

Resolved:

(i) that separate elections be held for each position to be filled since the delegation of the United Kingdom pointed out that in this way a proper geographical distribution of Bureau membership would be more easily ensured;

(ii) that, as a general principle, each country should not be represented on the Bureau by more than one member.

Minute 4 *Statutory report of the President on the general state of the Union*

Resolved: that the report of the President on the general state of Union be received.

Minute 5 *Adoption of the Comptes Rendus of the XXth Conference*

Resolved: that the Comptes Rendus of the XXth Conference be approved.

Minute 6 *Approval of the appointment of a Finance Committee*

Resolved: to approve the appointment of a Finance Committee as follows:
Prof. J.C. BAILAR (USA), Convenor and Chairman
Dr. C.O. GABRIELSON (Sweden)
M.J. GIVAUDON (France)
Prof. O. HORN (Germany)
Prof. A. NASINI (Italy)
Dr. O.A. REUTOV (USSR)
this committee to meet on Thursday 3 August and report back to the second meeting of the Council.

Minute 7 *Ratification of the appointment of a Drafting Committee*

Resolved: to approve the appointment of a Drafting Committee as follows:

Dr. D.C. MARTIN, Chairman
Prof. P. GIGUÈRE
M. J. GIVAUDON
Prof. C.A. McDOWELL

Minute 8 *Biennial Report of the Honorary Treasurer*

Resolved: that the Biennial Report of the Honorary Treasurer be accepted with thanks.

Minute 9 *Headquarters of IUPAC*

According to the Statutes the headquarters of the Union must be fixed by the Council every four years but they do not clearly state the length of time for which the headquarters must be fixed. The President ruled that it was the original intention that they should be fixed for a period of four years. There was no objection to this ruling.
Resolved: that in accordance with Chapter 1, Article 1 of the Statutes, the provisional headquarters of the Union continue to be in Paris.

Minute 10 *Proposal of the British National Committee for Chemistry with Regard to the interest of the chemical industry*

Resolved: that provision be made at the proper time in the Statutes to indicate specifically the interest of the Union in industrial chemistry.

Minute 11 *Adhering Bodies*

No new adhering bodies applied for membership of the Union.
Resolved: that the Council approves the change of category of the following member countries:

Belgium	from Category B	to Category A1
Denmark	from Category B1	to Category B2
Netherlands	from Category B	to Category A1

Minute 12 *Approval of the preliminary budget for 1962 and 1963*

Resolved:

(i) that the Council approve the recommendation of the Bureau that in 1962 funds may only be provided for meetings of Sections, Divisions, and Commissions which will take place in

Western Europe and in 1963 only for meetings of Sections, Divisions and Commissions in London.
There are two exceptions only, namely: (a) The Section President of the Physical Chemistry Section may go or be represented by one person travelling at the expense of IUPAC to the Symposium on Molecular Spectroscopy in Tokyo in 1962; (b) The Section President of the Biological Chemistry Section may go or be represented by one person travelling at the expense of IUPAC to the Clinical Chemistry Congress in Detroit in 1963;

(ii) that the Council unanimously decides that the minimum annual subscriptions be as follows:

Category A1	2 600 dollars
Category A2	5 000 dollars
Category A3	10 000 dollars
Category B1	800 dollars
Category B2	1 600 dollars
Category C	450 dollars

Minute 13 *Titular members of Commissions*

Resolved: that the Council reaffirms its view that the maximum membership of Commissions be reduced from 10 to 8 by proceeding on the basis that, whilst the maximum number should remain at 10 in the Statutes of the Union, the number should not normally exceed 8 except with the approval of the Executive Committee of the Union.

Minute 14 *Ratification by the Council of the decisions taken by the Bureau*

All adhering bodies had been informed previously about these decisions.

Resolved: that the Council ratifies the decisions taken by the Bureau since the XXth Conference.

Minute 15 *Adoption of the Section Presidents' Reports*

Contrary to the Statutes, but by unanimous approval of the Bureau and the Council the Section Presidents did not read their reports to the Council as they had previously been circulated in printed form in English and in French to the adhering bodies and to national delegates. The Section Presidents were, however, given the opportunity to make additional remarks if they so desired.
Resolved: that all six Section Reports be adopted.

Minute 16 *Minutes of the Section Presidents' Meeting in London in 1960 and 1961*

Resolved:

(i) that Council approves the action of the Executive Committee of arranging meetings of the Presidents of Sections and desires that these meetings continue at the rate of at least one each year;

(ii) that the Council approves in principle the following two resolutions proposed by the Section Presidents and recommended their adoption by the Sections:

(a) that Section Presidents should have the power to appoint their Section Secretaries; (b) that a Section President should have served two years as Vice-President before taking office as Section President.

Minute 17 *Formation of a new Commission of Colloid and Surface Chemistry*

Sir Eric Rideal gave a detailed account of activity in the field of colloid and surface chemistry during the Bureau meeting and by unanimous decision of the Bureau and the Council it was

Resolved:

(i) that the Council approves the creation of a new Colloid and Surface Chemistry Commission with a provisional duration of four years, to consist of 8 members and to be attached to the Physical Chemistry Section;

(ii) that, at present, there should be no Division on Surface Chemistry attached to the Applied Chemistry Section.

Minute 18 *Final Decision regarding the new Scale of Atomic Weights*

Resolved:

(i) that the Council adopts the new Scale of Atomic Weights based on the carbon isotope 12, as proposed by the Commission on Atomic Weights of the International Union of Pure and Applied Chemistry;

(ii) that the new Tables of Atomic Weights be given widespread publication.

Minute 19 *Report of the Verkade Committee on the duties of Officers of the Union*

Resolved:

(i) that Council approves the report of the ad hoc Committee appointed to describe the duties of officers of the Union, of Sections, Divisions and Commissions, as a basis for the future operation of the affairs of the Union;

(ii) that Council approves the resolution of this Committee that the President and Secretary of each Section should be *ex officio* members of all Divisions and Commissions in that Section.

Minute 20 *Problems regarding publication*

Resolved:

(i) that Council approves the issue of the tentative rules for abbreviations and symbols for chemical names of special interest in biological chemistry and also approves the amicable arrangement recently made with Butterworths for the widespread publication of the rules in appropriate chemical and biological journals;

(ii) that having heard the detailed statement from the Chairman of the Editorial Board Council on the expressed proposal of the President recorded its thanks to the Chairman and Editor for recent achievements.

Minute 21 *M.K.S.A.-C.G.S. System of Units*

Resolved: that Council approves the recommendation of the Physical Chemistry Section that

(i) Coulombs and volts and units derived from these be used in electrical problems;

(ii) in problems involving both electrical and mechanical quantities, the units of the M.K.S.A. System be used as basic units.

Minute 22 *Tentative recommendations for Steroid Nomenclature*

Resolved: that Council approves the *tentative* recommendations for Steroid Nomenclature (printed as an appendix to Information Bulletin No. 11).

Minute 23 *Rules regarding the election and term of office of the Union's official and of the members of Commissions*

Resolved:

(i) that the Council supports the suggestion of the Executive Committee that Sections be invited to adopt the practice of arranging that changes in the membership of Sections, Commissions and Divisions be effective from the end of a conference of the Union;

(ii) that an *ad hoc* Committee be set up, under the chairmanship of Prof. P.E. Verkade, to examine the structure of the Union, to make proposals for its revision including changes of the Statutes and report before the next Conference of the Union (London 1963).

Minute 24 *Problems of the Applied Chemistry Section*

Resolved: that the Council approves the structure of the Applied Chemistry Section as proposed in the report of the Section to the Council.

Minute 25 *Symbols for Helmholtz and Gibbs energies*

Resolved: that the Council approves the recommendation of the Physical Chemistry Section that as far as possible the letter "F" be not used for the Helmholtz and Gibbs energies but that "A" be used for the Helmholtz Energy and "G" for the Gibbs Free Energy, the letter "F" to be used only in very exceptional instances. Consequently in *The Manual of Physico-chemical Symbols and Terminology* (London, 1959), pages 14 and 15, numbers 309 and 311 be replaced by:

309	Helmholtz Energy	(Gibbs $\psi = E\text{–}TS$)	A
311	Gibbs Energy	(Gibbs $\zeta = H\text{–}TS$)	G

Minute 26 *Chemical engineering*

Dr. D. Behrens of the European Federation of Chemical Engineering gave a detailed report on the activities of this organization during the Bureau meeting and by unanimous decision of the Bureau and the Council it was

Resolved: to give affiliated status to the European Federation of Chemical Engineers and to try to make similar arrangements with other organizations of this kind in the Americas, Russia and Asia.

Minute 27 *Cooperation with WHO—"Generic Names"*

Resolved:

(i) that the Secretary General maintain contact with WHO in order to safeguard the interests of chemistry;

(ii) that he make appropriate proposals to the Executive Committee concerning any action which may be necessary.

Minute 28 *Cooperation with ISO*

A report from the Judicial Commission on Abbreviations of the International Union of Biological Sciences gave rise to much discussion in the Bureau meeting, particularly recommendation 2 of this report which reads as follows:

". . . that in the choice of abbreviations, international (ISO) and corresponding national standards be given precedence over proposals from international scientific bodies, which should again be given precedence over other codes, and that editors of periodicals keep in touch with competent bodies to ensure that agreed abbreviations are available and are used."

Resolved: that the Secretary General take appropriate steps both in ISO and in the Executive Board of ICSU.

Minute 29 *Report of the* ad hoc *Finance Committee*

Resolved: that the Council in adopting the report of the Finance Committee approve the following recommendations contained in the report:

(1) The Bureau of the Union be authorized to expend funds to meet the travel and subsistence expenses to Conferences of the Union for one delegate from each of those adhering bodies which are active members of the Union but have no representation on either Commissions or Committees of the Union.

(2) Following a suggestion by Sir ALEXANDER TODD and recommended by the Bureau, Conferences of the Union be held in such a way as to be economical and not necessarily in conjunction with Congresses. This may mean holding conferences always in Western Europe, possibly always in the same city. Conferences may be associated with colloquia and symposia to enhance scientific interest.

(3) The Bureau of the Union be authorized to decide in connection with each Conference whether charter flights should be arranged and if this is done to offer titular members the choice of using the charter flight or of receiving the equivalent of the charter flight fare.

(4) Adhering bodies be asked to pay or arrange for the payment of travel and subsistence expenses of their titular members whenever possible, such payments to be considered as contributions to the Union.

(5) Some person (or perhaps two or three persons) be appointed in an honorary capacity in each country to devise a more efficient means of raising funds in that country and to put such plans into effect.

(6) As occasion allows the Union funds which are now invested in government bonds and other funds available for investments be reinvested in the stocks of stable companies which have interests in chemical work.

Minute 30 *Election of four Bureau members*

All necessary steps to ensure fair elections had been taken well in advance. A letter (No. 4996) dated 15 March was sent to the adhering bodies asking for nominations to the Bureau and short biographies of the candidates were also requested. The procedure of election was decided earlier on in the meeting (see Minute 3).

(1) Prof. A. TOURKY was elected for two years (1961–1963) in place of Prof. LORA-TAMAYO. The voting was as follows:
For 104
Against 16

(2) Prof. GOVINDACHARI was elected for four years (1961–1965) in place of Prof. MIZUSHIMA. The voting was as follows:

1st	Prof. GOVINDACHARI	46 votes
	Prof. UZUMASA	42 votes
	Dr. A.L.G. REES	28 votes
2nd	Prof. GOVINDACHARI	68 votes
	Prof. UZUMASA	50 votes

(3) Prof. O. WICHTERLE was elected for four years (1961–1965) in place of Prof. URBANSKI. The voting was as follows:

Prof. WICHTERLE	64 votes
Prof. SCHAY	44 votes
Prof. TRZEBIATOWSKI	12 votes

(4) Dr. C.E. NABUCO DE ARAUJO, Jr., was elected for four years (1961–1965) in place of Dr. WICHERS. The voting was as follows:
For 72
Against 48

Minute 31 *Meetings scheduled for 1962, 1963 and 1964*

Resolved: to approve the following future meetings:

June, 1962	Bureau meeting	Brussels
11–14 June, 1962	75th Anniversary of the Société chimique de Belgique	Brussels
25–29 June, 1962	International Conference an Coordination Chemistry	Stockholm
27 August–2 September 1962	Symposium on the Chemistry of Natural Products	Prague
10–15 Sept., 1962	Symposium on Molecular Structure and Spectroscopy	Tokyo
17–19 Sept., 1962	International Symposium on Pharmaceutical Products	Florence
5–9 July, 1963	XXIInd Conference of IUPAC	London
10–17 July, 1963	XIXth International Congress of Pure and Applied Chemistry	London
20–25 July, 1964	3rd International Congress on Catalysis	Amsterdam
4–10 August, 1964	5th International Symposium on the Reactivity of Solids	Munich
September, 1964	Symposium on Natural Products	Japan

Minute 32 *Subjects of future Congresses*

Resolved: that the next IUPAC Congress should be concentrated on Organic Chemistry with a strong bias towards Biological Chemistry and that Analytical and Applied Chemistry should not be ignored.

Minute 33 *Affiliation of the International Congress on Catalysis*

Resolved: that the International Congress on Catalysis be affiliated to IUPAC.

Minute 34 *Vote of thanks*

Resolved: that the Union's grateful thanks be extended to our Canadian hosts for their invitation and for their untiring efforts to make the Conference a success.

MINUTES OF THE BUREAU MEETINGS

held in Montreal, 2 and 5 August, 1961

Present

Prof. W.A. Noyes, Jr., President
Prof. G. Chaudron
Prof. W. Klemm
Sir Alexander Todd
Prof. R. Belcher
Dr. J.H. Bushill
Prof. H.J. Emeléus
Prof. H. Erdtman
Prof. E.J. King
Prof. W. Kuhn
Prof. V.N. Kondratiev
Prof. M. Letort
Prof. S. Mizushima
Prof. T. Urbanski
Prof. P.E. Verkade
Dr. E. Wichers
Dr. R. Morf, Secretary General
Sir Charles Dodds, Honorary Treasurer

Excused

Prof. M. Lora-Tamayo
Prof. D. Marotta
Prof. A. Stoll
Prof. A. Tiselius

Newly-elected Bureau Members also present on 5 August:

Prof. H. Malissa
Prof. G.-M. Schwab
Prof. R. Tourky
Prof. O. Wichterle

Introduction

Most of the matters discussed during the meeting of the Bureau in Montreal were also discussed by the Council and were minuted as Council decisions (see Minutes of Council Meetings). Certain problems, mainly concerning the Applied Chemistry Section, were discussed in the Bureau but not in the Council, due to shortage of time. These few matters will be dealt with here.

Minute 1 *Agenda*

Resolved: that the Agenda as circulated by the Secretary General before the meeting be approved.

Minute 2 *Verkade Committee*

There was a long discussion during the Bureau meeting concerning the work of the new Verkade Committee (creation of which was approved by the Council—see Minute 23, Council Meeting, 1961).

Resolved: that the Committee should have very broad terms of reference and should study the future structure of the Union and election procedure as well as changes in the Statutes.

Minute 3 *Election procedure*

Resolved: that election procedure in Sections and Commissions must be very carefully scrutinized.

Minute 4 *Geographical distribution*

Resolved: that a clear procedure be worked out which guarantees appropriate geographical distribution wherever in the Union such distribution appears desirable. As a principle, such scientific bodies as Divisions, Sections and Commissions should be composed of scientific experts. Administrative bodies such as the Council, Section Committees, Bureau, etc., on the other hand, must have representatives from all parts of the World and must represent all the various branches of Chemistry—Pure, Applied and Industrial.

Minute 5 *Food Additives Commission*

The Food Additives Commission requested permission to increase its membership from 4 to 6 by the inclusion of one member from Europe and possibly one from South America.

Resolved:

(i) that permission be granted to the Food Additives Commission to increase its membership to 6;

(ii) that the Commission be allowed to have a meeting in 1962, in Western Europe.

Minute 6 *Formation of a Joint Commission within the Applied Chemistry Section*

The Water, Sewage and Industrial Wastes and the Fermentation Industries Divisions requested permission to form a Joint Commission to study "The utilization and treatment of Organic Wastes by Biological Methods". This would not require the appointment of additional titular members.
Resolved: that the creation of a Joint Commission for this purpose be approved.

Minute 7 *Formation of a Commission on Paper Analysis*

The Paper, Pulp and Board Division requested permission to form a Commission on Paper Analysis.
Resolved: that the formation of a Commission on Paper Analysis be approved.

Minute 8 *Sponsorship*

The Toxicology and Industrial Hygiene Division had been invited to hold a joint meeting with the Permanent International Committee on Occupational Health in Paris or Zurich in 1962. Sponsorship of IUPAC without financial support was requested.
Resolved: to grant sponsorship to this meeting.

Minute 9 *Organic Coatings Division*

This Division requested permission to meet in 1962.
Resolved: that the Organic Coatings Division be permitted to meet in Western Europe in 1962.

Minute 10 *Fermentation Division*

This Commission had been requested to postpone its meetings from 1961 to 1962.

Resolved: to confirm that this Commission will be permitted to meet in Western Europe in 1962.

AGENDA OF THE EXECUTIVE COMMITTEE MEETINGS IN MONTREAL

31 July, 1 and 5 August 1961

(101) Legal status of IUPAC
(102) Resignation of the Secretary of the Analytical Nomenclature Commission
(103) Problems of the Applied Chemistry Section
 (a) Formation of a Division of Surface Chemistry
 (b) Oils and Fats Division
 (c) Plastics and High Polymers Division, Sponsorship
(104) Publication problems—Royalties
(105) Breakdown of Unesco subvention
(106) IUB/IUPAC Co-ordinating Committee
(107) Reorganization of ICSU
(108) Co-operation with Unesco—survey of the teaching of Chemistry
(109) IUPAC representative to SCAR
(110) Appointment of inter-union liaison commission between those Unions interested in Geochemistry
(111) IUPAC representation on the Committee of experts for further work on the transport of dangerous goods

MINUTES OF THE 47th MEETING OF THE EXECUTIVE COMMITTEE

held in Montreal 31 July, 1 and 5 August, 1961

Present
Prof. W. Albert Noyes, Jr., President
Sir Charles Dodds, Treasurer
Prof. V. Kondratiev
Prof. Wilhelm Klemm
Prof. Maurice Letort
Dr. Rudolf Morf, Secretary General
Sir Alexander Todd

Introduction and general information

According to tradition and to the Statutes of the Union, the Executive Committee and the Bureau must go over the Agenda of the meeting of the Council. This procedure is time-consuming and complicated. In order to avoid endless repetition it is suggested that matters finally submitted to the Council shall be minuted only as Council decisions.

These minutes are therefore, confined to those matters which were considered by the Executive Committee alone. Minutes of the Bureau meeting will be restricted to those items, few in number, which were finalized by the Bureau.

Minute 136 Agenda

Resolved: that the Agenda as circulated by the Secretary General before the meeting be approved.

Minute 137 Minutes of the 46th meeting

The Minutes of the 46th meeting of the Executive Committee in Basle were taken as read, approved and signed.

Minute 138 Legal status of IUPAC

An appendix to the Minutes of the meeting in Basle contained a memorandum by M. Petitpierre, pointing out the advantages and disadvantages of the Union being incorporated under law and thus acquiring legal status.

The activities of the Union sometimes involve financial risks for the officers. This should be borne in mind when the legal status of IUPAC is being considered. On the other hand, it must also be remembered that the site of the headquarters of the Union might affect the tax position.

Resolved:

(i) that a decision be deferred until the members of the meeting have had time more fully to consider the Minutes of the last meeting;

(ii) that the Executive Committee take legal advice.
The Secretary-General to act.

Minute 139 Resignation of the Secretary of the Analytical Nomenclature Commission

A letter of resignation from Dr. A.M.G. Macdonald gave rise to detailed discussion.

Resolved: that a tentative recommendation be passed to the Committee of the Analytical Section that it might be advisable to discontinue the Analytical Nomenclature Commission for two years and that, in view of the fact that analytical nomenclature must be kept in line with the activities of other sections, the whole problem should be considered at the next meeting of the Section Presidents.

Minute 140 Oils and Fats Division of the Applied Chemistry Section

Resolved:

(i) that the members of this Division be reimbursed for expenses for the meetings in Bari and in London without creating a precedent;

(ii) that the Division receive no funds in 1962;

(iii) that in future the Executive Committee will not authorize expenditure incurred unless the prior approval of the Honorary Treasurer has been specifically obtained.

Minute 141 Standard Methods of Analysis of Oils and Fats

Resolved: that the recommendations on Standard Methods of Analysis of Oils and Fats be submitted to the Editorial Advisory Board urging early publication.

Minute 142 Plastics and High Polymers Division, sponsorship

At its meeting a few days before the meeting of the Executive Committee, the Commission on Macromolecular Chemistry decided to reduce the number of its symposia from one each year to one every two years and that the next symposium be held in Paris in 1963 as near as possible, in time, to the International Conference and Congress in London.
Several comments were made to the effect that the Symposium on Macromolecular Chemistry and that on High Polymers, both in Montreal, were arranged in such a way that those who wished to attend both had to remain 8 extra days in Canada.
The Société de Chimie industrielle in Paris has already planned a symposium and exhibition on Plastics and High Polymers to be held in 1962 and sponsorship has been requested at the suggestion of Prof. LETORT and the Division.

Resolved:

(i) that sponsorship be granted to this symposium;

(ii) that the proceedings should not be published by the Union.

Minute 143 Publication problems

Previous to the meeting of the Editorial Board a survey of the publication picture was made.
Resolved: that Messrs. Butterworths be requested to give

(i) a report including numbers printed, numbers sold and financial aspects of all publications (and particularly nomenclature reports) under the old contract;

(ii) in the future an annual report showing similar figures for "Pure and Applied Chemistry".

Minute 144 Breakdown of Unesco Subvention

The fact that ICSU has not provided any subvention for IUPAC publications although a very careful and detailed breakdown was supplied, was discussed.

Resolved:

(i) that the IUPAC representative to ICSU should enquire why this claim was not honored and

(ii) that ICSU be requested to reconsider its decision on this matter.

Minute 145 IUB/IUPAC Co-ordinating Committee

Quite apart from problems of organizing and co-ordinating future activities of the two Unions difficulties arising from the "Tentative Rules for Abbreviations and Symbols for Chemical Names of Special Interest in Biological Chemistry" could easily have been overcome by prompt action on the part of the Co-ordinating Committee.
A cable signed by the Honorary Treasurer and the Secretary General was sent to the International Union of Biochemistry asking for approval of these rules. An answer has not yet been received.
The Commission on Biological Nomenclature, by a majority of votes decided to change to a joint commission in which both Unions would be represented.

Resolved:

(i) that this latter proposal be accepted;

(ii) that, from now on, only IUPAC members of this joint Commission be paid travel and subsistence by IUPAC.

Minute 146 Co-operation with Unesco-Survey of the teaching of Chemistry

Resolved: that the Secretary General should continue to co-operate with Unesco and to implement any agreement which may eventuate between Unesco and IUPAC.

Minute 147 Co-operation with Unesco—Exchange of information in the field of theoretical catalysis

Resolved: that this matter be investigated by Prof. Schwab, President of the Physical Chemistry Section and that he should make proposals to the Executive Committee, in close co-operation with Prof. Farkas
Prof. Schwab to act.

Minute 148 IUPAC representative to the special Committee on Antarctic Research (SCAR)

Resolved: that Dr. Pantin should attend the meeting of SCAR in New Zealand and that he should receive travel and subsistence allowance for his expenses in New Zealand.
The Secretary General to act.

Minute 149 Appointment of Inter-Union Liaison Commission between those unions interested in geochemistry

Resolved: that Prof. Klemm should discuss the matter with the President of the Inorganic Section and that if possible the Bureau or the Section Presidents should make recommendations.

Minute 150 *IUPAC representation on the Committee of Experts for further work on the transport of dangerous goods*

Resolved: that the Secretary General should keep in touch with UNO-agencies in Geneva.
The Secretary General to act.

Minute 151 *Distribution of free copies of the "Journal of Pure and Applied Chemistry"*

Following the advice of the Editorial Board it was

Resolved: that the 100 free copies of the Journal received by the Secretary General should be distributed as follows:
One copy each to: Members of the Editorial Board, Members of the Executive Committee, Adhering Bodies, Section Presidents.

Minute 152 *Free reprints to authors*
Resolved:

(i) that not more than 25 free reprints should be given to authors of papers published in the Journal;

(ii) that, if there are more than one author, these 25 free reprints shall be divided between them;

(iii) that, in the case of commission reports, 25 free reprints should be given to the appropriate Section President to distribute.

Minute 153 *Budget*

Resolved:

(i) that a detailed budget be submitted to the Executive Committee in Rome;

(ii) that the Section President of the Physical Chemistry Section may go or be represented by one person travelling at the expense of IUPAC to the Symposium on Molecular Spectroscopy in Tokyo in 1962;

(iii) that the Section President of the Biological Chemistry Section may go or be represented by one person travelling at the expense of IUPAC to the Clinical Chemistry Congress in Detroit in 1963;

(iv) that the expenses of the President, Honorary Treasurer and Secretary General, paid from other sources, be entered in the accounts as expenses and counter balanced on the income side as a gift;

(v) a request for permission to have nine members had been received in writing from certain members of the Commission on Molecular Spectroscopy but, following the advice of the Presidents of the Section and of the Commission, it was decided that membership should be limited to eight.

Minute 154 *Meeting of Section Presidents*

Resolved: that the next meeting of Section Presidents should be convened by Prof. EMELÉUS.
Prof. EMELÉUS to act.

Minute 155 *Newly elected Bureau Members*

Resolved: that those members elected at Montreal shall not receive travel and subsistence allowances for the Montreal meeting unless they were already entitled to these allowances.

Minute 156 Terms of reference of the Committee appointed to review the statutes of the Union—Chairman: Prof. P.E. Verkade

Resolved:

(i) that Prof. VERKADE be invited to attend the meeting of the Executive Committee in Rome;

(ii) that, before this meeting, each member of the Executive Committee be invited to give their ideas concerning the future structure of the Union thus enabling the Committee to draft the final terms of reference of the Committee at this meeting.
For this purpose, the following guiding principles should be considered:

(a) More autonomy for the Sections and more secretarial help. However, if permanent secretaries for the Sections are appointed they should be in the same office as the Secretary General in order to save unnecessary repetition and duplication and to ensure close co-operation;

(b) sooner or later it will be necessary to appoint a permanent Secretary General and allowance should be made for this contingency in the statutes;

(c) careful consideration should be given to the proposals of Sir ALEXANDER TODD;

(d) regularization of Election procedure, both in elections to Sections, Divisions and Commissions and in Bureau elections;

(e) that the suggestion should be considered that a new section be formed providing for the interest of heavy industry.

Minute 157 Next meetings

Resolved: that the 48th Meeting of the Executive Committee should take place in Rome from 7 to 9 November 1961.

W.A. NOYES, Jr.
RUDOLF MORF

I. PHYSICAL CHEMISTRY SECTION

REPORT ON ACTIVITY

from August 1959 to May 1961

Section Committee and Section in general

The Section Committee had its last meeting in Munich 1959 and it will meet again in Montreal 1961.

The President took part in a Bureau meeting in Leningrad in May 1960, and attended a meeting of the Executive Committee in Basle in April 1961 and a meeting of the six Section Presidents in London in October 1960, where the general problems of the Union, the coordination of its activities, the organization of congresses, the publication problems, etc. were discussed. A further meeting of the Section Presidents will take place in June, preparatory to the Montreal Conference. The President also attented the Symposium of the Commission on Molecular Spectroscopy at Bologna (7–12 September 1959) and the meeting on Macromolecules at Wiesbaden (12–17 October 1959). He also represented IUPAC at the meeting of the Deutsche Bunsen-Gesellschaft in Karlsruhe (May 1961). At the BUNSEN-KIRCHHOFF-Centennial Celebration, which took place at Heidelberg in May 1960 under the auspices of the Deutsche Bunsen-Gesellschaft, the Academy of Heidelberg and the University of Heidelberg, with the sponsorship of IUPAC, the Union was represented by Prof. W. KLEMM.

Prof. JOST, President of the Commission on Symbols and Terminology, was delegated to take part in a meeting of ISO (International Standards Organization) at Copenhagen in June 1960. This was necessary as some of the ISO recommendations directly concerned IUPAC.

In a similar way Prof. O. WICHTERLE, Prague, and Dr. KLINE attended part of a meeting of ISO/TC11 on Plastics in Prague in October 1960, and Dr. D. C. MARTIN, London, attended the General Assembly of the International Scientific Radio Union (URSI) in London, September 1960. Prof. E. MIESCHER (Basle) represented the Union at the meeting of COSPAR (Commission on Space Research).

ACTIVITIES OF COMMISSIONS

I.1 Commission on Physico-Chemical Symbols and Terminology

(President: Prof. W. JOST)

The manual of Physico-Chemical Symbols and Terminology which was published in English and French by BUTTERWORTHS in August 1959 will be translated into the Russian language, according to a communication from Prof. GUERASSIMOW.

A report on the standardization of pH and related terminology, prepared by R. G. BATES and E. A. GUGGENHEIM, has appeared as a "preliminary publication" in Vol. 1 of the IUPAC Journal "Pure and Applied Chemistry".

Two important subjects are the CGS- and MKSA-systems of units on the one hand, and the symbols of some thermodynamic functions, in particular the symbols for the HELMHOLTZ and GIBBS free energy, on the other hand. There is in both cases a good probability of an agreement. The programme of future activity includes the formulation of the definitions of physicochemical quantities, as an addition to the symbols recommended in the manual.

I.2 Commission on Thermodynamics and Thermochemistry

(President: Prof. F. D. Rossini)

The Commission is continuing the publication of its "Bulletin of Chemical Thermodynamics", which has been much in demand by workers in these fields.

The Sub-Commission on Experimental Thermochemistry has completed the preparation of Vol. 11 on "Experimental Thermochemistry" under the editorship of Dr. H. A. Skinner.

The Sub-Commission on Experimental Thermodynamics is planning Vol. 1 on "Experimental Thermodynamics-Calorimetry of Non-reacting Systems", edited by Dr. J. P. McCullough.

The proceedings of the Wattens Thermodynamic Symposium (August 1959) will be published in the IUPAC Journal "Pure and Applied Chemistry" in Vol. 2 in June 1961.

The Commission has recommended to adopt a resolution on Publication of Calorimetric and Thermodynamic Data accepted by the Calorimetry Conference at its meeting in Gathinburg, Tennessee, in September 1959. This resolution which has been approved by the Bureau of the Physical Chemistry Section, the Executive Committee and the Bureau of IUPAC, will be published in the IUPAC Journal "Pure and Applied Chemistry".

The main Commission and the Sub-Commissions will hold meetings at Montreal; the Sub-Commission on Experimental Thermochemistry will collaborate in the 1961 Calorimetry Conference to be held at Ottawa on 14–17 August, immediately following the Montreal Congress. The Sub-Commission on Experimental Thermodynamics is collaborating with the IUPAC Commission on High Temperatures in sponsoring the Symposium on High Temperature Thermodynamics as part of the Montreal Congress, 7–11 August.

Change in name and organization of the Commission

Pending the final agreement by the Bureau and Council of IUPAC, the following new name and organization will become effective as from the close of the 1961 Conference of IUPAC in Montreal:

The present body consisting of a main Commission and two Sub-Commissions will be replaced by *one* Commission, whose name will become "Commission on Thermodynamics and Thermochemistry". The work of the hitherto main Commission and Sub-Commissions will be carried on through the use of special sub-committees, including Associate and National Members as well as Titular Members. The plan for future work includes, besides the publications mentioned, discussions involving the scale of temperature, the values of fundamental constants, symbols and names for thermodynamic properties and functions, the organization of symposia (the next one probably in 1963) and the compilation of thermodynamic and, later, transport properties of gases and gaseous mixtures.

I.3 Commission on Electrochemistry

(President: Prof. M. Pourbaix)

A symposium in conjunction with CITCE (affiliated to IUPAC) was held in Vienna (29 September to 2 October 1959). The Sub-Commissions on Electrochemical Data and on Electrochemical Symbols and Terminology of the IUPAC Commission on Electrochemistry had joint meetings at Brussels from 29 August to 3 September 1960, with the CITCE Commission 1 (Diagrams pH-tensions), 2 (Electrochemical Nomenclature and Definitions) and 5 (Corrosion). Further joint meetings of these Sub-Commissions with the

CITCE Commission took place in Brussels during the 12th meeting of CITCE from 24 to 29 April 1961.

The Commission on Electrochemistry will have its next meeting in conjunction with the 13th Meeting of CITCE during the Montreal Conference and Congress. A joint meeting is planned on this occasion with the Commission on Electrochemical Data of the Analytical Chemistry Section. The Commission on Electrochemistry will take part in the Congress Programme, particularly in the Colloquia on Molten Salts and on Electrode Processes.

A Report on Electrochemical Nomenclature and Definitions, prepared by the CITCE-Commission "Electrochemical Nomenclature and Definitions" and the IUPAC Sub-Commission "Electrochemical Symbols and Terminology", prepared by P. van Rysselberghe, will be completed and submitted to IUPAC for publication at the end of the Montreal Conference.

Moreover, the Rapport Technique RT 87 "Enthalpies libres de formation standard" (CEBELCOR, June 1960) by W. J. Hamer is nearing completion and will be submitted to IUPAC for publication.

A French version of the "Atlas d'Equilibres électrochimiques" will appear in a few weeks, and an English version of the same Atlas should appear in the summer of 1961.

I.4 Commission on Macromolecules

(President: Sir H. W. Melville)

The Commission met in Wiesbaden on 12 and 13 October 1959, and in Moscow on 15 and 17 June 1960. These meetings were held concurrently with symposia which had been arranged in collaboration with the Commission and the host countries concerned. The following matters were discussed and actions taken:

(1) Nomenclature

With so many new types of polymers being synthesized, the problem of nomenclature has become extremely complicated and early steps have been taken to try to achieve standardization to avoid confusion in the literature.

(a) German. After many years of discussion, final agreement has now been reached and the recommendations have been published in "Die Makromolekulare Chemie", *38*, pages 1–2 (1960).

(b) Russian. The system of nomenclature used at the Moscow Symposium will be formally put to the meeting in Montreal, and it is expected that it will be accepted. Arrangements for publication will be made.

(c) Japanese. A report on nomenclature is now being prepared.

(d) Stereo-regulated Polymers. The synthesis of stereo-regulated polymers had created difficulties in nomenclature. A special committee has therefore been set up under Dr. M. L. Huggins to prepare a report in English on this matter for the next meeting of the Commission. A preliminary report intended only for discussion has been printed in the "Journal of Polymer Science" to enable high polymer chemists to send in useful suggestions to the Commission.

(2) Molecular Weight Standardization: An earlier international experiment by the Commission on Molecular Weight Standardization was not entirely satisfactory mainly owing to the difficulty of preparing polymers with a narrow molecular weight distribution. Now that methods are available for preparing samples with a narrow distribution, another international programme has been initiated. Samples of polystyrene, prepared under carefully controlled conditions, have been distributed on a world wide basis to selected laboratories. Measurements using the osmotic pressure technique

are now in hand. It is expected that the preliminary results will be available at the Montreal meeting.

(3) Liaison with Plastics and High Polymer Division of IUPAC: In order to provide the necessary collaboration and to avoid overlap in activities, it was decided that:

(a) the agenda, minutes of meetings and programmes should be exchanged; and

(b) representatives of each Commission should be appointed to attend each other's meetings.

(4) Meetings: The next meeting will be held in Montreal at the end of July 1961. It is not expected that further meetings will be held until 1963. Two possibilities are one in France and another in India; Japan has also expressed an interest in having a meeting sometime in the future.

I.5 Commission on Physico-Chemical Data and Standards

(President: Dr. E. Wichers)

Following a recommendation made at the conclusion of the Symposium on Purity Control by Thermal Analysis, which was held at Amsterdam in April 1957, four preparations, prepared by the United States Bureau of Standards, were sent for cryometric study to 19 laboratories in Europe and in the USA. In the meantime all experimental work has been completed, the results analysed and a report made to the participants. On this basis the conclusions about the ways in which thermal analysis may be usefully applied to the evaluation of the degree of purity will be drawn and discussed in a symposium on 18 August 1961, as the closing days session of the Calorimetry Conference, at Ottawa.

The Commission has also undertaken a preliminary study of the current status of knowledge concerning basic physical constants and will make a report on this subject at the Montreal Conference.

A report will also be made at Montreal by the Commission Secretary, Dr. Smit, on the availability of standards of viscosity, and it will be discussed whether efforts should be made through the Commission to promote the distribution of such standards.

I.6 Commission on Molecular Structure and Spectroscopy

(President: Dr. H.W. Thompson)

A symposium and a meeting of the Commission took place at Bologna, 7–12 September 1959. The work of the Commission has been continued since then by correspondence and by unofficial meetings between members both in Europe and in the USA.

The report on infra-red wavenumber standards has been completed for the range 4000–600 cm^{-1}. The recommended data was collected in two parts, one for use with grating spectrometers of higher resolving power, and the other for small grating or prism spectrometers which are more generally used in applied chemical work. The report will be published by the IUPAC publishers in May 1961. It is intended to extend the region of standard infra-red wave numbers to the region below 600 cm^{-1}, in a further report.

There have been further discussions on the form of presentation of nuclear magnetic resonance data for chemists which might be acceptable to both European and American workers. Among other organizations, the American Petroleum Institute, the American Society for Testing Material, the British

Institute of Petroleum and the Chemical Society have been consulted. It is hoped shortly to be able to present an agreed recommendation for this.

A draft recommendation on the most desirable terminology and format for optical rotatory dispersion data has been prepared and submitted to leading specialists in this field. Although some differences of opinion are still under discussion, it should be possible very soon to make definite proposals.

Members of the Commission have been examining possible standards for infra-red band intensities, and progress will be reviewed at Montreal. Also, possible wavelength standards in the far ultraviolet are being examined. It has also been decided to extend the terminology for molecular vibrations which was considered earlier, with its translation into different languages.

At the suggestion of IUPAP, a *Triple Commission on Spectroscopy* has been definitely established with members from IUPAC, IUPAP and IAU, and, following discussions with the IUPAC Executive Committee, it has been agreed to appoint H. W. Thompson and R. C. Lord as IUPAC members, with S. Mizushima, R. N. Jones and J. Lecomte as correspondent members. The Triple Commission held a preliminary meeting at Ottawa in September 1960 when, by special arrangement, R. C. Lord and R. N. Jones attended, and it expects to meet again at Columbus in June 1961. The Triple Commission has already given provisional approval to the infra-red wave-number standards report mentioned above.

I.8 Joint Commission on Applied Radioactivity

(President: Dr. H. Seligman)

Meetings of the Commission took place at Paris on 27 October 1959 and in Copenhagen on 5 September 1960. Furthermore a panel of experts was assembled on 13 and 14 June 1960 in Vienna under Prof. B. Karlik.

The Commission, as a result of these meetings, agreed on the following points:

An actual radium source is not well suited as a standard of radioactivity except for intercomparison with radium itself. The need seems to be for a standard method to be chosen for each radioactive nuclide or group of nuclides with similar radiation properties.

It was suggested that it should be possible to select a limited number of radioactive nuclides of conveniently long half life and different radiation energies and to ascribe a standardized method to the measurement of each of these species. This method should be verified by exchange of samples between relevant laboratories. It should then be possible to relate every radioactive nuclide to one of the selected groups having similar characteristics in order to apply the right method of standardization.

The views thus expressed by the Commission have been communicated to the International Bureau of Weights and Measures, the International Commission on Radiological Protection, the international Organization for Standardization and a number of leading national laboratories engaged in the preparation of radioactive standards.

Furthermore, at the suggestion of the Commission, the IAEA (International Atomic Energy Agency) has prepared a list of references of publications dealing with procedures and techniques that have been developed in nuclear chemistry and physics and can be of interest to people not working in the field of radioactivity.

This list of references has been sent to about 250 institutions, and the Commission will wait for answers before deciding whether to continue with this work.

In co-operation with the IAEA a Symposium on the Detection and Use

of Tritium in the Physical and Biological Sciences was held in Vienna from 3 to 10 May 1961.

Future meetings: A meeting to be organized in conjunction with IAEA on the Use of Radioisotopes in Biological Sciences will presumably take place from 23 August until approximately 1 September 1961, and a Symposium on Age determination at the beginning of 1962.

The proceedings of the Symposium on Radioactivation Analysis, which took place in Vienna, 1–3 June 1959, appeared in Vol. 1 of the IUPAC Journal "Pure and Applied Chemistry" in September 1960.

International Committee for Electrochemical Thermodynamics and Kinetics

(Affiliated Commission) (President: Prof. M. POURBAIX)

The following three meetings of CITCE have taken place:
- from 21 September to 2 October 1959, in Vienna (11th full meeting)
- from 29 August to 3 September 1960, in Brussels (partial meeting)
- from 24 to 29 April 1961, in Brussels (12th full meeting).

At the plenary meeting in Vienna, during which the 10th anniversary of CITCE was celebrated and a part of which was held in conjunction with the Verein Österreichischer Chemiker, the main subject was Electrocrystallisation. The following six CITCE-Commissions met on this occasion:

Commission 1: pH-Tension Diagrams (author of review: M. POURBAIX)
Commission 2: Electrochemical Nomenclature and Definitions (author of review: P. VAN RYSSELBERGHE)
Commission 3: Experimental Methods in Electrochemistry (author of review: H. FISCHER)
Commission 4: Batteries (author of review: J.-P. BRENET)
Commission 5: Corrosion (author of review: M. POURBAIX)
Commission 6: Electrochemical Kinetics (author of review: H. FISCHER).

The partial meeting at Brussels was a convocation of the Commissions 1 (pH-Tension Diagrams), 2 (Electrochemical Nomenclature and Definitions) and 5 (Corrosion). A report about this meeting was published in the "Technical Report" RT 90 of the CEBELCOR on February 1961.

The plenary meeting at Brussels, consisting in part on "Electrochemistry and State of Surfaces", was organized in conjunction with the manifestations of the 10th anniversary of CEBELCOR (Centre belge d'Etude de la Corrosion) the principal subject being "Corrosion". On this occasion the Commissions 1 to 6 of CITCE were all assembled. The proceedings of the meeting will be published in "Electrochemical Acta".

The time of office of the 4 members of the Bureau of CITCE (president M. POURBAIX, vice-presidents A. RIUS, H. FISCHER and G. CHARLOT) expiring at the end of the Brussels meeting, a re-election being impossible according to the statutes, the membership of the Bureau was changed completely at the end of this meeting and it is now composed as follows:

President:	H. FISCHER (Germany)
Past-President:	M. POURBAIX (Belgium)
Vice-Presidents:	J.-P. BRENET (France)
	L. CAVALLARO (Italy)
	A. N. FROUMKINE (URSS)
	G. VALENSI (France)
Member:	S. TAJIMA (Japan)
General Secretary:	N. IBL (Switzerland)

The next plenary meetings of CITCE are scheduled as follows:

13th meeting: 7–9 August 1961, in Montreal
14th meeting: September 1962, in Rome
15th meeting: September 1963, in Moscow

Conclusion

There has been intense and useful work on the part of the Commissions. It is interesting to notice that much attention was given by everybody concerned with the coordination of activity of commissions working in related fields on the one hand and to a due contact with the activities of bodies other than IUPAC.

President of the Physical Chemistry Section. Prof. WERNER KUHN

REPORT ON THE ACTIVITY DURING THE MONTREAL CONFERENCE

2–5 August, 1961

All the meetings of the Section and of its Commissions scheduled in the Programme of the Conference have taken place; a successful symposium arranged by the Commission on Macromolecules was held at Montreal from 27 July to 1 August.

The Section President attended the Bureau and Council meetings on 2 and 5 August. He reported, on 2 August, on the activity of the Physical Chemistry Section in the period from August 1959 to May 1961. (See summarized Section reports, distributed before the 21st Conference.)

Proposals and Resolutions submitted to Bureau and Council

The Section President submitted three proposals and resolutions to the Bureau and Council.

(1) *Proposal to create a Colloid and Surface Chemistry Commission*

At the Bureau and Council meeting of 2 August, the Section President reported on a proposal made by Sir ERIC RIDEAL for action by IUPAC, aiming at the creation of a division or commission on Colloid and Surface Chemistry. Sir ERIC RIDEAL, who was present in person, had already pointed out, 4 years ago, that Surface and Colloid Chemistry is a vast field of science which has not hitherto been adequately represented in IUPAC (Information Bulletin No. 8, p. 50, 51, 1959): he gave a more detailed description of his ideas in April 1961 (Information Bulletin No. 14A, p. 39–41, 1961) which he explained briefly at the meeting. The Section President, who had discussed Sir ERIC RIDEAL's proposals both by correspondence and personally with several authorities in the field, then recommended to the Bureau and Council to create a *Colloid and Surface Chemistry Commission* of 8 members, attached to the Physical Chemistry Section with a provisional duration of 4 years. The terms of reference of the Commission will be in particular:

(a) *Symbols and Terminology* in basic research, e.g. the *symbols* for energy, free energy, entropy per unit of surface, for heat of adsorption at constant volume, at constant pressure, at constant surface coverage, for surface pressure, surface viscosity;

(b) *Definitions:* e.g. of size and sign of phase boundary potentials, pore volume, bulk density, particle density, types of isotherms;

(c) *Agreement* concerning the description of finely divided solids by indication of the adsorption per g of adsorbent of gases such as Nitrogen, Argon, etc.;

(d) *Conventions* in naming colloidal systems (e.g. Coacervates, Synaeresis, Tactosols, etc.);

(e) Symposia on special problems.

This proposition, which had also been recommended unanimously by the meeting of the Section Presidents in London on 26 June, was adopted by the Bureau and the Council.

In the Council meeting of 5 August a further resolution was presented by the Section President; it concerned:

(2) *CGS- and MKSA-Systems of Units*

In purely *electrostatic* problems, in particular in the definition and description of the dipole moment it has in the past been common practice to use electrostatic units. The advantage, when using this system, is based on the fact that if the CGS-System is used the energy of two charges, e_1 and e_2 at a distance r is simply

$$U = \frac{e_1 e_2}{r} \text{ erg}$$

The charge of an electron or proton is $e = 4{,}80 \cdot 10^{-10}$ e.s.u. if this system is used.

In problems relating to *electric currents*, on the other hand, it is almost universal practice to use coulombs, amperes, volts and units derived from these. The charge of an electron or proton is $e = 1{,}60 \cdot 10^{-19}$ C if this system is used. A disadvantage when using this system, is due to the fact that a numerical factor occurs in the expression for the energy U of two charges, e_1 and e_2 at a distance r; if the MKSA system of units is employed, the energy U is in this case

$$U = \frac{e_1 e_2}{r \cdot 9 \cdot 10^9} \text{ Joule}$$

A great advantage of the MKSA-system (where lengths are expressed in meters, masses in kilograms, etc.) is, on the other hand, that the energy (charge times potential) in a system where electrical charges are given in coulombs and potentials in volts, appears in joules and that the energy also appears in joules in a purely mechanical system, if lengths are measured in meters, masses in kilograms, e.g. $U = \frac{m}{2} u^2$ where u is the velocity in $m \cdot s^{-1}$. As a consequence of this, no numerical factors occur in the calculation of the kinetic energy of a particle of charge e and mass m which runs through a potential of E volt; a corresponding remark applies generally to all problems where both electrical and mechanical quantities are involved.

It is clear from this that an enormous simplification would result by the adoption of the meter and kilogram (instead of the cm and the g), i.e. by the general adoption of the MKSA-System. It must, however, be stated that a large proportion of physicochemical data is tabulated in the current text books and in numerical tables in CGS-Units which as long as electrical units are not implied, differ from MKSA-units only by powers of 10. It does not seem advisable for the reason of practical convenience to replace these in daily use by MKSA-units, e.g. to express concentrations in kg m^{-3}, the cm and the g being in most cases more convenient for the description of laboratory apparatus and results than the m and the kg.

The attention is therefore drawn to the simplifications which become possible if electric charges are expressed in coulombs instead of electrostatic units and to the simplification which is obtained in problems involving both electrical and mechanical quantities by the use of the MKSA-System.

It is therefore *recommended:*

(1) that coulombs and volts and units derived from these should be used in electrical problems;

(2) that in problems involving both electrical and mechanical quantities, the units of the MKSA-System should be used as basic units.

This recommendation has been discussed and unanimously accepted (a) by the Commission on Symbols and Terminology, (b) by the Section Committee, (c) by the assembly of the Physical Chemistry Section. It was, on 5 August, adopted by the Council for preliminary publication.

A further recommendation which was also presented to the Council on 5 August was:

(3) *Symbols for Helmholtz and Gibbs Free Energy*

There is general agreement that the symbol for energy should be

Energy E or U

and that the symbol for Enthalpy (which differs from U or [E] by the additional term pV) is:

Enthalpy $H = U + pV$

The Helmholtz free Energy is related to U by the equation

Helmholtz free Energy $= U — TS$

and we have the analogous definition

Gibbs free Energy $= H — TS$

A serious difficulty arises from the fact that, due to independent development in the past, a great group of European scientists is using the symbol F for $U — TS$ and a group of scientists overseas the same symbol F for $H — TS$.

In order to remove misunderstandings due to the dual use of the symbol F it is recommended: That the symbol A should as far as possible be used for the Helmholtz free Energy $U — TS$ and the symbol G for the Gibbs free Energy $H — TS$.

It has been recommended by a group of Physical Chemists that the adjective "free" should be dropped and that the shorter terms Helmholtz Energy and Gibbs Energy should be used instead of Helmholtz free Energy and Gibbs free Energy. The alternating use of these terms did not during the Montreal discussion give rise to any misunderstandings. A decision whether the adjective "free" should be used or dropped may, if necessary, be taken after further deliberations.

The resolution taken at Montreal then reads as follows: In order to eliminate a controversy of long standing it is recommended to replace in the Manual of Physico-Chemical Symbols and Terminology (London 1959), pages 14 and 15, numbers 309 and 311, by

309 Helmholtz Energy (Gibbs $\psi = U — TS$) A...F*

311 Gibbs Energy (Gibbs $\zeta = H — TS$) G...F*

* Symbols preceded by three dots are alternatives to be used only when there is some reason for not using the symbol before the three dots.

This recommendation was discussed and accepted, first by the Commission on Symbols and Terminology, in conjunction with the Commission on Chemical Thermodynamics and, subsequently, by the Section Committee and the assembly of the Physical Chemistry Section. It was adopted by the Council for preliminary publication.

Thanks is expressed in particular to Prof. W. JOST for his careful preparation of this and the foregoing resolutions.

Elections

Elections had to take place in order to assure a smooth working of the Commissions and in particular to replace officers, titular and associate members whose terms of office had come to an end. The thanks of the Union was expressed to the retiring officers and members and in particular to Prof. ROSSINI, who guided the work of the Commission on Chemical thermodynamics, and now is replaced by Prof. K. SCHAEFER, and to Prof. M. POURBAIX, who was secretary of the Section and president of the Electrochemistry Commission (now replaced in the latter function by Prof. VAN RYSSELBERGHE).

Prof. SCHWAB was elected for the office of the Section President for 1961–1965. Following the new rule concerning the election of Section Secretaries Prof. SCHWAB proposed Dr. G. EMSCHWILLER, secretary of la Société de Chimie physique de France, who was elected a member of the Section committee and subsequently designated by Prof. SCHWAB to be the Section Secretary for 1961–1965. Sir HARRY MELVILLE was elected Vice-President of the Physical Chemistry Section for the period 1961–1963.

Further members of the section committee may be elected in the near future in order to provide section committee members who might become vice-presidents in 1963 and section presidents in 1965.

The number of titular members was, in accordance with the decision made by the Council, generally reduced to 8.

In order to prepare for the election of titular members of the Commission on Colloid and Surface Chemistry (see part I, 1) a nominating committee has been established, consisting of Sir ERIC RIDEAL, presumably the President, Dr. ZISMAN, presumably the secretary of the new commission and the section president Prof. SCHWAB, who will send the list as soon as it is available to the Secretary General for confirmation of the membership by the Bureau and the adhering bodies.

FURTHER COMMISSION ACTIVITIES

In addition to the Commission activities involved in resolutions 2 and 3 (see above part I) and in the elections, the following commission activities are reported:

I.1 Commission on Physico-Chemical Symbols and Terminology

(President: Prof. W. JOST)

Meetings of the Commission were held on 2, 3 and 4 August, of which the last half hour was a joint meeting with the Commission on Electrochemistry. On 4 August, there was an additional joint meeting with the Commission on Chemical Thermodynamics. The following were present as titular members: W. JOST (President), M. BRUSSET (Secretary), FARRINGTON DANIELS, J.I. GERASSIMOV, A. ÖLANDER, G. WADDINGTON.

Present as observers were: W. JAENICKE, C.A. GABRIELSON (2 August).

The Commission considers close co-operation with ISO and IUPAP (SUN) as essential for its further work.

Following earlier suggestions by Prof. J.A. CHRISTIANSEN the Commission

intends to give definitions of the quantities contained in the Manual, to work out units according to the MKSA rules, and to recommend practical units for Chemists.

If possible, at a commission meeting in 1963, a revised edition of the Manual will be proposed.

The Commission adopted in principle a proposal of Soviet scientists concerning definitions of reaction rates, which will be worked out in 1963.

M. BRUSSET will represent the Commission at a meeting of the SUN Commission in Paris from 4 to 8 September. The Commission authorized M. BRUSSET to consult with representatives of Applied Chemistry and Chemical Engineering and to report to the Commission on questions of symbols and terminology as far as they concern Physical Chemistry.

A commission meeting is scheduled for 1963, London.

I.2 Commission on Chemical Thermodynamics and Thermochemistry

(President: Dr. F.D. ROSSINI)
(New President: Prof. K. SCHAEFER)

Meetings of the Main Commission were held on 2 and 4 August. The Sub-Commission on Experimental Thermochemistry and the Sub-Commission on Experimental Thermodynamics met jointly at one session on 3 August, 1961.

The Sub-Commission on Experimental Thermochemistry held sessions on 2 and 3 August.

The Sub-Commission on Experimental Thermodynamics held session on 2 August, 1961.

The Main Commission on Chemical Thermodynamics held one session jointly with the IUPAC Commission on Physicochemical Symbols and Terminology on 4 August, 1961.

The Main Commission on Chemical Thermodynamics held one closed executive session on 4 August, 1961.

The following persons were present at the appropriate sessions of the Main Commission and the two Sub-Commissions:

Titular Members of the Commission on Chemical Thermodynamics: K. SCHÄFER, Secretary (Germany), J. COOPS (Netherlands), D.M. NEWITT (GB), K.S. PITZER (USA), H.A. SKINNER (GB), B. VODAR (France), G. WADDINGTON (USA), F.D. ROSSINI, President (USA).

Titular Members of the Sub-Commission on Experimental Thermochemistry: H.A. SKINNER, President (GB), S. SUNNER, Secretary (Sweden), J. COOPS (Netherlands), M. COLOMINA (Spain), G. WADDINGTON (USA), W.N. HUBBARD (USA), J.D. COX (GB).

Titular Members of the Sub-Commission on Experimental Thermodynamics: D.M. NEWITT, President (GB), G. WADDINGTON, Secretary (USA), J.A. MORRISON (Canada), B. VODAR (France), K.S. PITZER (USA).

Observers of the Commission on Chemical Thermodynamics: C.W. BECKETT (USA), J.I. GERASSIMOV (USSR), R. HARA (Japan).

Observers of the Sub-Commission on Experimental Thermochemistry: J.P. MCCULLOUGH (USA), B.J. ZWOLINSKI (USA), E.J. PROSEN (USA).

Observers of the Sub-Commission on Experimental Thermodynamics: J.P. MCCULLOUGH (USA), B.J. ZWOLINSKI (USA), E.F. WESTRUM (USA), E.F.G. HERINGTON (GB).

The plans for future activities are:

(a) The continuation of the Bulletin on Thermodynamics and Thermo-

chemistry the size of which runs at present to about 130 quarto pages with an issue in 1962 of 1000 copies. The Bulletin which is prepared by members of the Commission is distributed throughout the world and is now in demand also in the atomic energy and space research institutions. A Subvention of $1000 is asked for this purpose.

(b) Edition of Vol. II of the book "Experimental Thermochemistry" under the editorship of Dr. H.A. SKINNER, which is expected to appear by the end of 1961.

(c) Edition of Vol. 1 of the book "Experimental Thermodynamics; Calorimetry of non-reacting systems"; under the editorship of Dr. J.P. McCULLOUGH, which will appear, it is hoped, in 1963.

(d) Edition of Vol. II of the book "Experimental Thermodynamics; Properties of Fluids", preparation of articles is now starting under the editorship of B. VODAR.

(e) Sponsoring of a project involving the preparation and publication of IUPAC Tables of Thermodynamic Properties (including some transport-properties) of Gases. The project, which will be realized by Prof. D.M. NEWITT, will cover (1) survey of existing data; (2) identification of areas in which data are incomplete; (3) initiation of work to complete such areas; and (4) publication of IUPAC tables.

The Commission requests approval of this project in principle and the recommendation of IUPAC when applying for sources from funds known to the Commission and available specifically for the project.

(f) Sponsoring of a 3 or 4 day Symposium on Thermodynamics and Thermochemistry to be organized by Dr. STIG. SUNNER, cosponsored by Swedish scientific groups, to take place in Lund (Sweden) in the summer of 1963, preceding the IUPAC Conference. A subvention of $2000 is asked for this purpose.

I.3 Commission on Electrochemistry

(President: Prof. M. POURBAIX)
(New President: Prof. P. VAN RYSSELBERGHE)

Meetings of the Commission were held on 3 and 4 August, 1961. The following persons were present at the two meetings: Dr. POURBAIX, President; Prof. VAN RYSSELBERGHE, Vice-President; Prof. VALENSI, Secretary; titular members: Dr. HAMER, Dr. IBL; associate members: Dr. BATES, Prof. DEFAY, Prof. KETELAAR; invited: Mrs. REID, Dr. WAGMANN.

Present at one of the two meetings only were: associate members: Prof. FEITKNECHT, Prof. HUBER; invited: Prof. DELIMARSKII.

Apologies for absence were received from the titular members: Prof. A.N. FROUMKINE, Prof. E. LANGE.

Two documents are ready for preliminary publication:

(a) Tables on Thermodynamic data (prepared by Prof. M. POURBAIX and by Dr. W.J. HAMER and their collaborators, Sub-Commission 2.1);

(b) Report on Electrochemical Symbols and Terminology (prepared by Prof. P. VAN RYSSELBERGHE and collaborators).

Future activity comprises:

(1) in Sub-Commission 1 (Electrochemical Symbols and Terminology): continuation of work on electrochemical nomenclature and definitions, particularly in connection with the following topics: non-isothermal electrochemical systems and fundamentals of electrochemical kinetics. Collaboration with the IUPAC Commission on Physico-Chemical Symbols and Terminology.

(2) In Sub-Commission 2 (Data on Electrochemical Thermodynamics):

(a) *Tables on thermodynamic Data.* The Sub-Commission will promote and guide the collection of selected values for thermodynamic data of interest to electrochemistry. This will be done in close co-operation with the Commission on Electrochemical Data and with the Commission on Equilibrium Data (Section of Analytical Chemistry).

(b) *Diagram of Electrochemical equilibria.* The Sub-Commission will promote and guide the establishment of diagrams of electrochemical equilibria.

(3) In Sub-Commission 3 (Data on electrochemical kinetics): the Sub-Commission will promote and guide the critical study of experimental methods and of their results (polarisation curves, exchange currents, transfer coefficients, etc.).

Meetings and Symposia scheduled

For 1962 Rome (September 1962): Meetings of the three sub-commissions, on the occasion of the 13th annual meeting of CITCE.

For 1963 It is expected that the whole Commission will meet in London (July 1963) on the occasion of the 22nd Conference of IUPAC.

It is also expected that the three sub-commissions will meet in Moscow (September 1963) on the occasion of the 14th annual meeting of CITCE.

I.4 Commission on Macromolecules

(President: Sir H. Melville)

Meetings of the Commission on Macromolecules were held in Montreal on 28 and 31 July, 1961. The following were present:

Chairman: H.W. Melville (GB).

Titular Members: V.A. Kargin (USSR), C. Sadron (France), I. Sakurada (Japan).

National representatives: H. Benoit (France), O. Ellefsen (Norway), J. Furukawa (Japan), W.R. Krigbaum (USA), M. Magat (France), S.R. Palit (India), A.J. Staverman (Netherlands), K. Vesely (Czechoslovakia), J.W. Breitenbach (Austria), J.D. Ferry (USA), G.M. Guzman (Spain), H.L. Williams (Canada), A. Nasini (Italy), G. Smets (Belgium), V.N. Tsvetkov (USSR), I.O. Wichterle (Czechoslovakia).

Others: G. Dring (GB), Chairman of Plastics and High Polymer Commission IUPAC; M. Goodman (USA), representing H. Mark; N.L. Huggins (USA) and *S.M. Atlas (USA), authors of report on nomenclature of stereoregulated polymers; N. Kryszewski (Poland), representing T. Urbanski; G. Mayerhoff (Germany), representing W. Kern; **R. Morf (Switzerland), Secretary General IUPAC; *G.M. Kline (USA), Secretary of Plastics and High Polymer Commission IUPAC; *W. Kuhn (Switzerland), President of Physical Chemistry Section.

* present for meeting on 31 July only; ** present for meeting on 28 July only.

During the symposium (27 July–1 August) a report, made by a special Commission (presided by Dr. Huggins) on the nomenclature of stereoregulated polymers was adopted and will be transmitted to the Publication Commission for preliminary publication; translations of the document will be made in Russian, French, German, Italian, Spanish, Japanese, Polish and Czechoslovakian.

Reports will be prepared for reactivity ratios in high polymer reactions and concerning the measurement of tacticity.

Standard samples of polystyrene were sent to 20 laboratories for molecular weight determination. Excellent agreement was obtained for molecular weights between 50000 and 250000; at molecular weights of about one million less good agreement was obtained. A final report covering a survey of all the laboratories that participated will be prepared.

This experiment having been successful, an international series of standards can, in principle, be prepared. The next step will be to invite the national standard laboratories of the countries concerned to consider how suitable substandards can be provided to users as a routine matter.

Future Meetings

General discussion showed that it is neither possible nor desirable to hold large (1000 members) polymer Symposia frequently. It is difficult for all countries, particularly the small ones, to cope with the organization. The subject matter covered by such a Conference is often too broad and significant advances in polymers science are not recorded. As a matter of principle it was agreed that such conferences should not be held more often than every two years. It was agreed that smaller conferences, dealing with a narrower field might be held in between the large meetings. These arrangements would make it possible for the Commission at sufficiently frequent intervals to do its business effectively. This is particularly necessary because of the large number of national representatives.

It was agreed that the Commission should meet, in 1962, at a place to be determined, but that *no* conference be organized separately in conjunction with the meeting of the Commission.

The next Symposium will be in Paris in July 1963, after the conclusion of the Congress in London.

It is likely that a Symposium will be arranged in India towards the end of 1964.

The representative from Japan invited the Commission to visit Japan in 1966. He would be responsible for arranging a Symposium at that time.

Arrangements for co-operation with the plastics and high polymer group of IUPAC (Applied Chemistry Section) continued to work smoothly.

I.5 Commission on Physico-Chemical Data and Standards

(President: Dr. E. Wichers)

Meetings were held on 3 and 4 August, 1961, the following were present: Dr. E. Wichers, President (USA), Dr. S. Sunner, Vice-President (Sweden), Dr. W.M. Smit, Secretary (Netherlands), Dr. A.L.G. Rees (Australia), Dr. Ch. Proffer (USA), Dr. L.A.K. Staveley (GB).

Associate Member: Dr. R.P. Graham (Canada).

Invited: Dr. G. Waddington, Prof. Timmermans.

Dr. Saylor reported on the co-operative test on purity control by thermal analysis. The Commission proposes to have this report and the proceedings of a symposium on this subject, which is to be held in Ottawa as a part of the program of the Colorimetry Conference published in "Pure and Applied Chemistry" and also separately reprinted.

Furthermore, the Commission received and discussed a proposal made by Dr. S. Sunner and Dr. G. Waddington that a monograph be prepared by the Commission on purification and purity control. The matter will be discussed in more detail by correspondence after the Ottawa Symposium which is expected to give further results for the problem of purity determination.

Dr. Smit will attempt to organize a comparative and co-operative test on the determination of viscosity.

For the preparation of a list of basic physico-chemical constants (Faraday Constant, Avogadro number, etc.) the formation of a joint committee with the International Union of Physics is considered.

As prospective delegates of IUPAC, the Commission proposes: Dr. E.A. Guggenheim, Dr. G.P. Saylor, Dr. L.A.K. Staveley, Dr. J. Terrien and Dr. G. Waddington.

Dr. Rees presented a report from Dr. J. D. Morrison on ionisation potentials. He has during the Montreal Conference established a preliminary contact with Dr. H.W. Thompson, president of the Commission on Molecular Spectroscopy.

Dr. Wichers reported on some new thermometric standards utilizing slow freezing of phenol (41 °C), naphtalene (80 °C) and phtalic anhydride (131 °C) to establish reference temperatures. The cells are primarily intended for the calibration of "Solidification point" thermometers. The maximum temperatures in these cells appear to be reproducible within a few thousandths of a degree C.

The proposal of Prof. Swietoslawsky concerning the nomenclature of Azeotropes will be deferred until the appearance of his book. It will be considered whether it will be useful to send the proposal to the Commission on Physico-Chemical Symbols and Terminology.

Dr. G. Waddington (invited to attend a part of the session) reported on the activities of the Office of Critical Tables, an agency of the National Research Council (USA).

Prof. Timmermans reported on the history of the Bureau International des Etalons physico-chimiques whose activities were terminated when he retired from the University of Brussels. Prof. Timmermans said that with these remarks he wished to take leave of the Commission with which he had been associated throughout its entire existence. The Chairman expressed to Prof. Timmermans the thanks of the Commission for his long and faithful services.

A symposium on purity control by thermal analysis was held in conjunction with the International Calorimetry Conference in Ottawa on 18 August, 1961. The results of the comparative tests carried out by 20 laboratories were discussed. It appeared that in general the measurements were more consistent than past experiences would have indicated.

The next Commission meeting is scheduled for 1963 (Conference of London).

I.6 Commission on Molecular Structure and Spectroscopy

(President: Dr. H.W. Thompson)

Sessions were held on 3 and 4 August, 1961. The following were present:

Titular Members: H.W. Thompson, President (GB), R.C. Lord, Vice-President (USA), R.N. Jones, Secretary (Canada), J.A.A. Ketelaar (Netherlands), J. Lecomte (France), R. Mecke (Germany), S. Mizushima (Japan).

Associate Members: R.R. Brattein (USA), M. Kent Wilson (USA).

Advisory Counsellor: G. Herzberg (Canada).

National Observer: T. Urbanski (Poland).

By invitation: V.N. Kondratiev (USSR).

Apologies for absence were received from A. Mangini (Italy), A.N. Terenin (USSR) and G. v. Duyckaerts (Belgium).

The relations with the newly established Triple Commission for Spectroscopy were discussed and reports received on the first two meetings of that body.

Plans for the extension of the tables on infra-red wavenumber standards from 600 cm^{-1} to 10 cm^{-1} were discussed and the Sub-Committee on Wavenumber Standards was reorganized to expedite the work by bringing in specialists in the field of far Infra-Red Spectroscopy.

The problem of Infra-Red Intensity Standards was discussed. It was agreed that the demand for such standards is increasing as more chemists are using grating spectrometers. Considerably more research will be necessary before such standards can be formulated.

Considerable progress has been made in standardizing the recording of nuclear magnetic resonance spectra and final agreement of this problem should be forthcoming in the near future.

Progress in the standardizing of nomenclature and representation of optical rotatory dispersion curves was reported and a final report will be ready very soon.

The need for wavelength and intensity standards in the Ultraviolet between 1750 Å and 2200 Å was emphasized, and a working group was established.

Plans were formulated for standardization in the translation of spectroscopic terms among the common scientific languages.

The next meeting is planned in Tokyo in September 1962 in connection with the International Symposium on Molecular Structure and Spectroscopy.

I.8 Joint Commission on Applied Radioactivity

(President: Dr. H. Seligman)

This Commission did not meet in Montreal.

International Committee of Electrochemical Thermodynamics and Kinetics. CITCE

(Affiliated Commission, President: Prof. H. Fischer)

The Bureau and the Council of CITCE met at Montreal on 8 August, 1961. The decision was taken that the next meeting of CITCE will take place at Rome, 24 to 29 September, 1962, the main subject being: Recent methods for the study of the kinetics of electrodes and their application.

The Commission on Electrochemical Nomenclature and Definitions under the chairmanship of Prof. van Rysselberghe discussed in particular the chapter on electrochemical kinetics, part of the Report on Electrochemical Nomenclature and Definitions. An extensive discussion took place on the application of the terms "tension" or "potential" in electrochemistry.

The Electrochemistry Contribution to the 18 IUPAC Congress at Montreal was organized jointly by CITCE and the Electrochemistry Commission of the Physical Chemistry Section of IUPAC; the programme of the electrochemistry meetings being organized by Dr. Cohen, National Secretary of CITCE for Canada, and by Prof. Wetmore. 56 papers on kinetics of electrode processes and the electrochemistry of fused salts were presented.

Conclusion

Useful and intense work has been achieved by the various commissions. Results of particular importance are the agreements expressed in the resolutions concerning the CGS- and MKSA-Systems of units on one hand, and the symbols for the Helmholtz and Gibbs free energies on the other hand. It must be recognized that sacrifices had to be made by all sides to reach such agreements. A spirit of friendly co-operation prevailing throughout all these negotiations and discussions led in important cases to final solutions.

W. Kuhn, President

II. INORGANIC CHEMISTRY SECTION

REPORT ON ACTIVITY

This report deals with the activities of the Section and its Commissions for the period 1959–1961. It will be recalled that the Inorganic Section had a major share in the programme of the 1959 Congress in Munich. The intervening years have been ones of relative quiescence. The Section Committee will meet in Montreal, as will the Commissions on Atomic Weights and on High Temperatures and Refractories, as well as the Sub-Commissions on Gases and on Condensed States. The interests of the Commission on High Temperatures are also fully represented in the programme of the Montreal Congress. Reports on the activities of the Commissions follow.

II.1 Commission on Atomic Weights

One of the major tasks of this Commission, namely the formulation of a new scale of atomic weights, is nearing completion. It was proposed to the Bureau of IUPAC at Munich that, in view of the highly specialized nature of the Commission's work, some of its members should be re-elected in spite of their having served for the maximum period of eight years. In fact four titular members were re-elected (including the new President, Prof. T. BATUECAS), together with four new titular members (including the new Vice-President and the Secretary). There are, in addition, four associate members who were chosen from among the retiring members, and who were clearly in a position to give valuable advice on current problems.

The Commission has been concerned for a number of years with the task of finding a single scale of atomic masses which will be acceptable both to chemists and physicists. The value 12.00000 for 12C was recommended for adoption by physicists at the Ottawa Meeting of IUPAP (September 1960). It seems exceedingly probable that, after the Commission has met at Montreal, a similar recommendation will be made for adoption by IUPAC. The advantages of such a unique scale are already widely known and such disadvantages as exist have been carefully assessed by the Commission. If this recommendation is made and adopted, it will be necessary to publish a revised table of atomic weights for all the elements, including those which are radioactive. Some consideration will also have to be given to the tasks of the Commission in the future.

II.2 Commission on the Nomenclature of Inorganic Chemistry

This Commission is entering upon a new phase of its activity, based largely on the consideration of special topics by its Sub-Commissions. The Sub-Commission on the Nomenclature of Organometallic Compounds, which is a joint Sub-Commission with the Organic Nomenclature Commission, met at Scheveningen in July 1960. It considered the general principles on which the nomenclature of these compounds should be based and thus made a valuable start in its consideration of this difficult problem. The other Sub-Commissions have not met formally, and neither the main Commission nor its Sub-Commissions will meet at Montreal. An American Chemical Society report entitled "The Nomenclature of Organic Boron Compounds" has been received but has not yet been discussed.

II.3 High Temperature Commission

Prof. BREWER has resigned as Secretary of the Sub-Commission on Gases for reasons of health, and Prof. STARKMAN, of the University of California, has accepted an invitation to serve in his place. A number of titular and associate members of the High Temperature Commission met on the occasion of the Symposium on High Temperature Technology held in October 1959 at Asilomar (California). This meeting considered the bibliographical service provided by the Commission.

The bibliographical service was initiated in 1957, following decisions taken by the High Temperature Commission at the IUPAC meeting in Paris. The work has continued since then without interruption. The number of countries collaborating was 3 in 1957, 6 in 1959 and 10 in 1961. The way in which the service operates is that one expert in each participating country produces a bibliography of publications from his own country in the field of "condensed states". The countries participating at present are: Australia, Austria, Germany, Canada, the USA, France, Great Britain, India, Japan, Holland and the Scandinavian countries. Provisional arrangements have been made to cover the literature of the USSR and steps are being taken to cover other countries. The bibliographies are published in one or other of the three official languages used by IUPAC, and the contents are arranged according to an agreed plan suggested by Prof. HÄGG.

The material is collected from the participating countries by Dr. FŒX, the Secretary of the Sub-Commission on Condensed States, and is reproduced at three centres, each of which covers the cost of reproduction and distribution in an agreed area. The three centres are:

(1) in France, at the Solar Energy Laboratory, Montlouis (Dr. FŒX; about 500 copies; distribution in Europe, USSR, Australia, India, Japan);

(2) in the USA, at the National Bureau of Standards, Washington (Dr. WALKER and Dr. DIAMOND; about 1000 copies);

(3) in Canada, at the Department of Mines and Technical Surveys, Ottawa (Dr. BRIGHT; 200 copies).

There are four issues each year and the total number of titles in 1960 was about 1700. It should be noted that the possibility of issuing these bibliographies as part of the normal scheme for IUPAC publications was explored at Munich in 1959. The present system has the great advantages of minimal delay and lower costs. The present arrangement also has flexibility. Thus, for example, it was possible in the Bibliography for October–December 1960 to give a list of the Sectional Lectures in the Montreal Symposium on Chemical Thermodynamic Properties at High Temperatures. Lists of specialists in the field of high temperatures for several of the participating countries have also been included. Preliminary consideration is being given to the organization of a similar service for the Sub-Commission on Gases.

II.4 Commission on Geochemistry

The Commission on Geochemistry was active during 1960. It appointed a committee to discuss matters of co-operation in international meetings in geochemistry. This committee met with IUGG at Helsinki and co-operated with that Union in holding a symposium on geochemistry. At this symposium a special committee was appointed by IUGG with the following terms of reference: (1) to supervise programmes and other matters of interest to geochemists within IUGG, and (2) to co-operate with other international organizations which are interested in geochemistry.

A symposium on the geochemistry of sedimentary carbonate rocks was organized and sponsored by the Commission as part of the International

Geological Congress held in Copenhagen in 1960. The proceedings of this symposium will appear as a special issue of "Geochimica et Cosmochimica Acta". There was a full meeting of the IUPAC Commission on Geochemistry at Copenhagen, and some of the sessions were held in conjunction with the IUGG committee which had been appointed in Helsinki. Both the Commission on Geochemistry of IUPAC and the International Geological Congress appointed groups similar to that appointed by IUGG at Helsinki. These three groups were then constituted as an informal inter-union committee to foster co-operation in geochemistry among interested international organizations, and to help them in planning programmes and symposia in geochemistry. Prof. KRAUSKOPF, of Stanford University, is chairman of this committee and Prof. INGERSON is secretary. At the suggestion of Dr. FRASER of the Secretariat of ICSU the committee applied to ICSU for affiliation as a formal inter-union committee. Such a proposal requires approval by the interested bodies. Approval has already been given by IUGG, and it is hoped that a similar action will be taken by IUPAC at Montreal.

The Commission is not planning any meeting or symposia in conjunction with the Montreal meetings of IUPAC.

The activities of the Commissions on Atomic Weights and Nomenclature call for little special comment. Both are working on problems, international agreement on which is vital. If, as is hoped, agreement is reached on the new scale of atomic weights, other important problems will remain to be considered. Equally, there are still a number of important areas in the nomenclature of inorganic compounds, which have to be considered in detail. We may therefore anticipate that these Commissions will continue the excellent work which they have done in the past. The work of the Commission on Geochemistry will, I believe, be assisted very much if the relationship between this Commission and other bodies interested in Geochemistry can be clarified. This should be treated as a matter of urgency.

The main activities of the High Temperature Commission which has been reported are the holding of symposia and the publication (without expense to the Union) of bibliographies. It is evident that the latter service has been most successful. This type of activity is relatively new. It is truly international in character and would be difficult to operate on any other basis.

H. J. EMELÉUS, President of the Inorganic Chemistry Section

III. ORGANIC CHEMISTRY SECTION

REPORT ON ACTIVITY

The International Symposium on the Chemistry of Natural Products, sponsored by IUPAC, was held in Australia (Melbourne, Canberra and Sydney) from 15 to 25 August 1960. Sir ALEXANDER TODD acted as President.

It was felt by all foreign visitors that Australia was a most appropriate venue for the symposium, since a number of active phytochemical groups there have contributed very considerably to our knowledge of natural product Chemistry. It was interesting to note that in spite of the distance a large and representative attendance came from overseas.

This memorable meeting was excellently organized and many of the world's leading organic chemists were lecturing. There can be no doubt that this symposium made a strong and long lasting impact on Australian natural product research. Most of the foreign visitors took advantage of one or more of the many interesting and well organized excursions to various parts of the Australian continent. These were arranged in conjunction with the symposium itself and were conducted by Australian colleagues.

A number of particularly fortunate visitors were invited to visit New Guinea, a trip as interesting from a phytochemical as colourful from an ethnological point of view. Those present will probably never forget the stupefied faces of the Papuans as they witnessed the pompous conferment of the degree of Doctor of Philosophy, honoris causa, of "Wau University" on Sir ALEXANDER TODD.

The organization of the International Symposium on Pharmaceutical Chemistry to be held in Florence in September 1962 has made steady progress. There will be about eight main lectures by well-known scientists covering the whole field from drug-receptor interaction to the structural chemistry of alkaloids and antibiotics.

The Second International Symposium on Natural Products will be held in Prague in 1962. The President visited Prague in January this year and was informed about the organization of this meeting. Most of the lectures and other functions will take place in the large Hotel International, which provides, excellent, modern facilities.

Japanese organic chemists are entertaining plans for holding the Third Symposium on Natural Products in Japan in 1964. There are great similarities between organic chemistry in Australia and in Japan, both countries having fostered great schools of natural product research. In view also of the obvious importance of the Australian symposium for the advancement of the Australian natural product research as well as the great attraction exerted by the latter symposium on overseas visitors, it is hoped that the Japanese plans will materialize and that IUPAC will be able to sponsor the Symposium.

A very useful meeting of the Section Presidents took place in London in October 1960. Many important problems were discussed, such as the financial position of IUPAC, its publication policy, the various commissions and the organization of the sections.

Another meeting of the Section Presidents was held in London in June of this year. One of the main items will be the Montreal conference.

The IUPAC Commission on the Nomenclature of Organic Chemistry met at Scheveningen (Netherlands) on 11–16 July 1960. All the members were present. The meetings were also attended by Prof. K.A. JENSEN (Copenhagen), representing the IUPAC Commission on the Nomenclature of In-

organic Chemistry, Prof. Dr. A. P. TERENTIEV (Moscow) and Dr. V. M. POTAPOV (Moscow).

The principal topic of the meetings was the discussion of a considerable number of reports prepared by members of the Commission, covering the whole field of the nomenclature of functional groups. Very good progress was made with this work.

On 14 July a joint committee consisting of some members of the IUPAC Commission on the Nomenclature of Organic Chemistry and some members of the IUPAC Commission on the Nomenclature of Inorganic Chemistry (Prof. JENSEN; Dr. J. CHATT, Welwyn, Hertshire, England; Prof. L. MALATESTA, Milano; Prof. Dr. H. REMY, Hamburg) met for a discussion of the nomenclature of organometallic compounds.

A drafting committee of the IUPAC Commission on the Nomenclature of Organic Chemistry, consisting of Dr. R. S. CAHN (London), Dr. G. M. DYSON (Loughborough, England) and Dr. H. S. NUTTING (Midland, Michigan, USA), met for some days at Midland at the end of January 1961. It dealt with the reports on the nomenclature of functional groups discussed and modified during the Scheveningen meetings. These were transformed into a homogeneous set of rules, which will ultimately form Section C for the IUPAC Nomenclature of Organic Compounds. This set of rules has been written as far as possible in the same way as Sections A (Hydrocarbons) and B (Fundamental Heterocyclic Systems), which appeared in 1958.

This set of rules will be discussed at the next meeting of the Commission, which at generous invitation from the American side will take place at Columbus (Ohio) on 20–26 July 1961. It is hoped that in this year or at least in 1962 Section C will be available for tentative publication by IUPAC.

A small group, including members of the IUPAC Commission on the Nomenclature of Organic and Biological Chemistry and specialists in the field of steroids, met for a few days at Basle (Switzerland) for a discussion of new proposals for steroid nomenclature.

The IUPAC Commission on Codification, Ciphering and Punched Card Techniques met at Scheveningen (Netherlands) on 6–9 July for a last revision of the text of the International Notation System.

Subsequently four members of this Commission, Dr. R. S. CAHN (London), Dr. G. M. DYSON (Loughborough, England), Prof. W. BAKER (Bristol) and Prof. Dr. P. E. VERKADE (The Hague), met for three days at Loughborough in October 1960 and prepared the text of the International Notation System, as accepted at Scheveningen, for the printer.

The proofs have already been corrected and the book will be published by Longmans this year. The title will be: Rules for IUPAC Notation for Organic Compounds, issued by the Commission on Codification, Ciphering and Punched Card Techniques.

The creation and recommendation of "Generic names" for pharmaceutically active compounds is causing considerable concern, and attention will be devoted to this important problem. Co-operation between WHO, IUPAC and other organizations will probably be needed in this matter.

H. ERDTMAN, President of the Division of Organic Chemistry

IV. BIOLOGICAL CHEMISTRY SECTION

REPORT ON ACTIVITY 1959/1960

The following are brief reports on the activities of the Commissions in the Section for Biological Chemistry:

IV.1 Commission on the Nomenclature of Biologic Chemistry

The Nomenclature Commission met in Amsterdam on 17–18 April 1961; subjects discussed included:

(i) revision of existing Rules of Nomenclature;
(ii) future work of the Commission;
(iii) relations with the Editors' Commission of IUB (to be set up at the Moscow Conference).

The Tentative Rules on Abbreviations and Symbols for Chemical Names of Special Interest in Biological Chemistry were published as Appendix B to "Information Bulletin" No. 13.

IV.2 Commission on Proteins

The Commission is concerned mainly with the compilation of specifications on 14 well-definied proteins. A list of the type of data required has been prepared by Prof. J. W. Williams (USA) and circulated to individuals who were considered by the Commission at the Munich Meeting in 1959 to have authoritative knowledge of the proteins concerned.

Dr. R. Schwyzer (Switzerland) is considering the classification of proteolytic enzymes by their action on certain larger peptides, e.g. the synthetic octa- and decapeptides hypertensin II and I. Proteolytic activity might thus be defined in terms of a peptide "finger print", which may become of use for testing the purity of enzyme preparations or for the purposes of standardization.

E. J. King, President

IV.3 Commission on Clinical Chemistry

The Clinical Chemistry Commission held a very successful Congress in Edinburgh in August 1960. There were five to six hundred people registered, and a series of excellent symposia and meetings for offered papers were held. The Commission met several times (before, during and after the Congress). Some new Titular Members and National Representatives were welcomed for the first time; an invitation was received and accepted (in principle) from the American Association of Clinical Chemists and the Canadian Society for Clinical Chemistry to hold a Congress in a border city (Detroit-Windsor) in September 1963; a request from the Belgian Clinical Chemists for a IUPAC sponsored symposium on enzymes in Ghent in April 1961 was approved, and this two-and-a-half day symposium was also a great success; the Clinical Enzyme Sub-Commission agreed to give wide publicity to their proposals for the new International Units of enzymes, and the President, Colonel M. E. Freeman, has drawn up a statement of the proposals and published this in several biochemical medical journals.

24 November, 1961

A decision made by the Executive last summer that no financial help could be given to this Congress, and that the Clinical Chemistry Commission must meet in London in 1963, rather than in Detroit, caused much alarm

and despondency to the American and Canadian organizers, and strong feeling amongst the European societies of clinical chemistry. They all are very anxious that the Commission go to Detroit. I, therefore, made a proposal to the Treasurer, Sir CHARLES DODDS, to put forward to the Executive meeting in Rome, that the sum of money budgetted for bringing the Clinical Commission to London should be used to take some of them to Detroit, or pay part expenses of all of them. It should be pointed out that the clinical chemists have expressed a strong disinclination to attend a Congress of Organic Chemistry, in which they have so very little interest. I, and those of my colleagues in the Section to whom I have mentioned the matter, have been very encouraged by the information from Sir CHARLES DODDS that the Executive were agreeable to this request.

Clinical enzyme unitage

Interpretation and translation of the many arbitrary, varied and unrelated clinical enzyme units in current use have been a source of misunderstanding and confusion among clinical chemists. This will continue to be a vexing problem until steps are taken to reach some agreement on a common unitage. The problem is obviously complicated by crude reactants and poorly defined reactions. It is, therefore, manifestly impossible to reach a completely satisfactory solution in every case. However, it was the considered opinion [1] of the Joint Sub-Commission on Clinical Enzyme Units of the International Union of Biochemistry and the International Union of Pure and Applied Chemistry, meeting in Munich in 1959, that some clarification should be attempted, that dimensions should be in basic units, clearly defined and acceptable to all chemists and clinicians. The conclusion and recommendation of the Joint Sub-Commission was that wherever practicable clinical enzyme units should be defined as micro-moles of substrate transformed per minute under specified conditions, and their concentration in terms of a millilitre (or litre) of serum, plasma or urine. Where this is impossible or difficult because of the complex nature of the substrate and uncertainty as to the nature of the products, e.g. with fats, proteins or starch, the units should be expressed in terms of the analysable substances or groups determined to measure the reaction, e.g. fatty acid, amino or carboxyl groups and reducing groups. Thus, for instance, with a phosphatase the enzyme activity can be expressed as micro-moles of organic phosphate hydrolysed (i.e. of phosphate liberated) per minute per millilitre (or litre); with amylase as micro-moles of reducing group.

This recommendation is in conformance with the report of the Enzyme Commission of the International Union of Biochemistry [2].

Secretary, Sub-Commission (of IUPAC and IUB) on
Clinical Enzyme Units, 1500 Massachusetts Avenue,
N.W., Washington 5, DC (USA)

MONROE E. FREEMAN

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The President of the Section, Prof. KING, undertook to write a paper on the implementation of these recommendations for the conversion of established enzyme unitages and the institution of new ones, and this has been published in "Clinica Chimica Acta" and in the "Proceedings of the Association of Clinical Biochemists"; the President likewise undertook to write a History of the Commission on Clinical Chemistry and the International Federation of Clinical Chemistry, and this has been published, a reprint of which follows as an appendix.

Past President of the Clinical Commission of the International Union of Pure and Applied Chemistry, and of the Committee of the Federation (Postgraduate Medical School, London)

Reprinted from "Proceedings of the Association of Clinical Biochemists", Vol. 1, No. 2, pages 22–25, November 1960.

In September 1951 the International Union of Pure and Applied Chemistry (IUPAC) held a Conference and Congress in New York. Prof. A. TISELIUS, then President of the Biological Chemistry Section of IUPAC, became President of the Union, and Sir CHARLES DODDS (then Prof. E. C. DODDS) succeeded him as head of the Biological Chemistry Section, with Prof. MURRAY LUCK as Secretary. The writer was in New York at this time, at the invitation of the American Association of Clinical Chemists, and was approached by the representatives of the Biological Chemistry Section of IUPAC to join and take on the Presidency of the Commission on Clinical Chemistry, to consist of himself, Prof. WARREN SPERRY (USA) and Prof. PAUL FLEURY (France). TISELIUS, DODDS and LUCK felt that there was a need for an international body, with the backing and support of a Union, to pull together and correlate the activities of the very few known national societies of Clinical Chemistry, and to encourage the formation of such societies in other parts of the world; furthermore, that the chemists and biochemists who worked in hospitals and the clinical departments of medical schools were now sufficiently numerous, at least in the principal countries, to warrant drawing them together into some sort of loose organization and to periodic meetings which might well be on an international scale.

During the following winter of 1951/52 correspondence took place between KING, SPERRY and FLEURY as to possible avenues of profitable activity. An invitation was then received from the Netherlands Society of Clinical Chemistry that an international congress be held in Amsterdam in the Spring of 1952, to which the clinical chemists of the world would be invited, and which should be the occasion for the foundation of an international organization of clinical chemists, as well as forming a congress for the presentation of lectures and research communications. Negotiations were already well forward with the French clinical chemists and biochemists to organize and strongly back a medical and clinical section of the International Congress of Biochemistry planned for Paris in August of that year. It was represented to the Dutch chemists that the International Congress in Paris would be attended by biochemists and clinical chemists from all over the world, and that this would probably be a more favourable occasion and place to launch a new International Federation of Clinical Chemistry than would Amsterdam in the Spring. It is to the very great credit of the Netherlands Society that they immediately agreed to withdraw their proposal and to meet with the other clinical chemists of the world in Paris that summer.

The members of the IUPAC Commission on Clinical Chemistry (FLEURY, KING and SPERRY), with the informal support of representatives of other known existing national societies, organized a meeting for the afternoon of 24 July in the Sorbonne. There was a large attendance by clinical chemists from many countries, several of them the official spokesmen of national societies. Dr. I. D. P. WOOTTON (London) acted as Secretary, and Dr. RAMON of FLEURY's Department, an accomplished linguist, acted as interpreter. There was enthusiastic support for the proposal to found an International Federation of Clinical Chemistry, and to set up a Committee of persons who

should be named as the official representatives of existing national societies. It was further agreed that the Commission of Clinical Chemistry of IUPAC should be enlarged to include these national representatives, and that it should act as the Committee of the new International Federation of Clinical Chemistry. No constitution or settled rules were envisaged for the new Federation at that time, but a set of aims and objects was discussed and the following unanimously agreed:—

(1) An International Association of Clinical Biochemists shall now be formed, whose function shall be to advance knowledge in and promote the interests of biochemistry in its clinical (medical) aspects.

(2) The Commission on Clinical Chemistry of the Section of Biological Chemistry of the International Union of Pure and Applied Chemistry shall act initially as the Committee of this International Association of Clinical Biochemists. The Committee shall subsequently include representatives from national societies.

(3) The Committee shall set up Sub-Committees to deal with specific matters of a special nature (e.g., with internationally agreed ways of expressing results), as may seem indicated from time to time.

(4) The Committee shall make attempts to ascertain the titles of existing Societies of Clinical Biochemistry (or Societies serving the same function under different names) and of their officers, and it shall endeavour to promote the foundation of societies in countries where they do not already exist.

(5) From the lists of names of members of existing societies and from the names of such other persons as may be ascertained to be practising clinical biochemistry, the Committee shall prepare an international list of Clinical Biochemists, with their addresses and, where ascertainable, their principal scientific interests.

(6) The International Association of Clinical Biochemists will meet during and before and after if deemed advisable the International Congresses of Biochemistry, and its members will use the Clinical Chemistry section of the Congress as a forum in which to present their communications.

(7) The Committee shall represent to the local organizing committee of the Congress that symposia on subjects of special interest to clinical biochemists be held during the Congress and possibly during a day (or two) preceding the Congress.

(8) The Committee shall encourage and attempt to promote regional meetings on a semi-international scale.

(9) The Committee shall receive and circulate information regarding special new techniques and other matters of interest which might not be readily available through the ordinary vehicles of publication.

(10) The Committee or a Sub-Committee shall arrange for the circulation of solutions and samples for the comparison of methods and results and shall attempt to standardize the expression of results of such methods as are expressed in units or other arbitrary terms.

In the summer of 1953 a new enlarged Commission and Committee met in Stockholm, at the International Congress of Chemistry which was being held there. The following attended and were received into full Titular Membership of the Commission on Clinical Chemistry by the Biological Section of IUPAC.

E. J. King, President (UK)
I. D. P. Wootton, Secretary (UK, rep. Brit. Assoc. Clin. Biochem.)
P. Fleury (France, rep. Soc. Fr. Biol. Chim.)

A. Sobel (USA, rep. Amer. Assoc. Clin. Chem.)
B. Josephson (Sweden, rep. Scand. Soc. Clin. Chem. and Clin. Physiol.)
J. C. M. Verschure (Netherlands, rep. Neth. Soc. Clin. Chem.)
W.M Sperry (USA) was unable to be present

At their meetings the new Commission and Committee agreed to attempt the organization of regular congresses of Clinical Chemistry at two or three year intervals, to encourage the holding of regional semi-international meetings of clinical chemists in adjacent countries, to promote the foundation of new national societies of Clinical Chemistry in countries where there appeared to be sufficient numbers of interested persons and of "groups" of clinical chemists within other societies, biochemical, biological, chemical, pathological, etc., where the numbers were not sufficient to make viable independent societies, to set up an international haemoglobin standard in co-operation with the Protein Commission of IUPAC, and to conduct an international trial of analytical methods commonly used in the clinical laboratory to compare the results obtained in different laboratories of the countries represented.

The first International Congress of Clinical Chemistry was appropriately held in Amsterdam in September 1954. It was an outstanding success. People attended from almost every country in the world. There were over five hundred registered participants, and while most of them were from Western Europe, there were several from North America, and a few from as far away as Australasia, India and South America. The organized symposia set a high scientific standard, and the short communications offered were of wide interest. Dr. J. C. M. Verschure and Dr. Th. Strengers (President and Secretary) and their Committee produced a model of organization and successful conduct which succeeding congresses have not excelled.

At this meeting an informally convened group of National Representatives considered a proposal from the publishing firm of Elsevier that the newly-founded Journal "Clinica Chimica Acta" should become the official organ of the International Federation of Clinical Chemists. While there was some support for the idea in Western Europe, it was felt by those countries which already had their own Journals (e.g. Scandinavia, USA, etc.) that it would not be wise for the new International Federation to have a new single publication of its own; but that the Federation should give its full moral support and backing to "Clinica Chimica Acta".

For the Biochemical Congress in Brussels in 1955, a strong Clinical Chemistry section was organized, Committee meetings of the Commission and Committee were held, and there was a General Meeting of the Federation, which was well attended, like those in Amsterdam and in Paris. There was also a very successful banquet, organized by the Belgian Clinical Chemists, at chich over a hundred attended.

Colonel M. E. Freeman replaced Dr. A. Sobel as the American representative in 1955.

An American invitation for a congress in New York in 1956 had been received in Amsterdam in 1954 and its acceptance was confirmed in Brussels in 1955.

The Second International Congress of Clinical Chemistry was held under the auspices of the American Association of Clinical Chemists in the Park Plaza Hotel in New York in September 1956. Dr. Albert Sobel was the President, Dr. Max Friedman (Secretary AACC) and the American Committee furnished an excellent programme in symposia and several sections, and the excellent entertainment culminated in a banquet.

A Scandinavian invitation to a congress in Stockholm in 1957 was received and accepted at this time. It met under the Presidency of Dr. J. Lehmann,

and this Third International Congress was as successful as its two predecessors.

In 1958 the Austrian organizers of the Biochemical Congress in Vienna arranged for a Clinical Chemistry section to be held within the Congress and for a banquet for the Federation. A General Meeting was held after one of the scientific sessions, when the Committee again reported on the activities of the Federation, as it had done at previous Congresses. Several changes were made in the composition of the Commission and Committee: Dr. WOOTTON resigned as Secretary and was replaced by Colonel M. E. FREEMAN (USA); Prof. N. F. MACLAGAN (UK) succeeded Dr. WOOTTON as the representative of the British Association of Clinical Biochemists; Prof. J. COURTOIS succeeded Prof. PAUL FLEURY as representative of the Société française de Biologie clinique; Prof. K. HINSBERG became the representative of Germany; and Prof. V. OREKHOVICH representative of the USSR. Dr. S. H. JACKSON had been suggested from Canada as the representative of their Society of Clinical Chemistry, Prof. R. RUYSSEN from Belgium, and Dr. M. C. SANZ from Switzerland.

At the IUPAC Conference held in Munich in August 1959, these names were submitted to and agreed by the Biological Section and the Council of IUPAC. Prof. KING resigned and Colonel FREEMAN succeeded him as President. Prof. SPERRY retired under the IUPAC eight year rule. The full composition of the Commission, subsequently confirmed as the Committee at the general meeting in Edinburgh in 1960, was therefore as follows:—

Titular Members: FREEMAN, M.E. (USA), President; JOSEPHSON, B. (Scandinavia), Secretary; COURTOIS, J. (France); HINSBERG, K. (Germany); JACKSON, S.H. (Canada); MACLAGAN, N.F. (UK); OREKHOVICH, V. (USSR); VERSCHURE, J.C.M. (Netherlands).

National Representatives: RUYSSEN, R. (Belgium); SANZ, M.C. (Switzerland).

Note.—Titular members of a IUPAC commission receive their travelling expenses to meetings; their number is limited to eight. National representatives are full members of the commission, but do not receive their travelling expenses.

For 1960 an invitation had been sent from the British Association of Clinical Biochemists to hold a congress of Clinical Chemistry in Edinburgh. This was received at the meeting in New York in 1956, and was confirmed in Vienna in 1958. Under the Presidency of Sir RUDOLPH PETERS, a highly successful Congress of symposia, communications and demonstrations was held in the week 14–19 August 1960. There were nearly 600 registered participants. Dr. C. P. STEWART (Chairman), Dr. S. C. FRAZER (Secretary, Organizing Committee) and Dr. B. C. JOCELYN (Secretary, Programme Committee) provided excellent entertainment as well as an outstanding scientific programme. At the Commission and Committee meetings it was reported that the Sub-Commission on Clinical Enzymes had met at Munich and had recommended that enzyme activities be reported in terms of micro-moles of substrate transformed per minute per litre; that a new scheme was in hand to despatch accurately analysed samples of freeze-dried blood plasma to selected laboratories in different countries to establish uniformity of analytical results; that an invitation had been received from the Canadian Society of Clinical Chemistry and the American Association of Clinical Chemists to hold a Congress in a border city in 1963; that in addition to the countries already having National societies of clinical chemistry, Yugoslavia, Portugal, Japan and Australia were forming new societies; agreed that a sixth congress be held in Southern Europe in 1966; that a Directory of member societies, including names and addresses of officers, be prepared, and that the officers of the Commission and Committee should now draw up a constitution and

bye-laws for the International Federation of Clinical Chemistry, which should be sent to the adhering national societies and subsequently discussed at ensuing Commission and Committee meetings and at the next General Meeting to be held, probably, in a USA—Canadian border city. The following motion was put to the General Meeting by the Commission and Committee and was agreed: be it resolved that the retiring Committee of the International Federation of Clinical Chemistry (IFCC) does now recommend to the IFCC that the arrangement begun in Paris 1952, and subsequently confirmed in Amsterdam in 1953, Brussels 1955, New York 1956, Stockholm 1957, and Vienna 1958, whereby the Commission on Clinical Chemistry of IUPAC acts as the Committee of the IFCC be confirmed and continued.

It is further recommended that in the future, as in the past, the membership of the Commission and Committee be reviewed at each of its meetings in the light of the wishes of the National Societies of Clinical Chemistry, in order that proper representation of International Clinical Chemistry may be maintained, and that changes recommended shall be presented to the next ensuing General Meeting of the IFCC and to the Biological Section of IUPAC for confirmation.

Summary

A Commission on Clinical Chemistry was formed in the Biological Section of IUPAC in 1951. The International Federation of Clinical Chemistry (IFCC) was founded in Paris in 1952. International Congresses of Clinical Chemistry have been held in Amsterdam (1954), New York (1956), Stockholm (1957), and in Edinburgh (1960). Sections of Clinical Chemistry have been organized (with the co-operation of the Committee of IFCC) in the International Biochemical Congresses in Paris (1952), Brussels (1955), and Vienna (1958). The Commission on Clinical Chemistry acts as the Committee of the IFCC, and holds its meetings both at the International Congresses of Clinical Chemistry and (usually) during the International Congresses of Biochemistry. The activities of the IFCC include the holding of congresses, the setting up of standards of reference, e.g. haemoglobin, international trials of methods of analysis in clinical chemistry, the organization of schemes for the preparation of standard sera for analyses, the encouragement of scientific activities within national societies, the formation of new societies, intercourse between them, and the holding of symposia on subjects in clinical chemistry organized by societies within countries as well as internationally.

E. J. King, President

V. ANALYTICAL CHEMISTRY SECTION

REPORT ON THE ACTIVITIES

In this last year of office, the President wishes first of all to place on record his sincere appreciation of the whole-hearted support which he has received from his Section Committee and from the Section in general.

The various administrative difficulties which troubled the Section during the past few years seem to have been solved to the satisfaction of the majority of members. Certain problems outside the immediate control of the Section itself have proved more intractable.

Section Committee Members

President R. Belcher (UK) retires after the XXIst Conference. He will be succeeded by Prof. G. Duyckaerts (Belgium), whose nomination has been approved by the Section. Profs. L. Gordon (Secretary, USA), I. P. Alimarin (USSR) and P. W. West (USA) continue as members until 1963. Profs. G. Charlot (Vice-President, France), F. Feigl (Brasil), G. Kortüm (Germany), A. J. Ringbom (Finland), T. Takahashi (Japan) and A. A. Smales (UK) retire this year. Elections are in progress to determine the new composition of the Committee. The system used, which was outlined in the last Presidential Report and which is intended to ensure broad representation, appears to be working well.

Meetings and Symposia

Most of the Section met during the XXth Conference (1959) of the Union, and it is hoped that the whole Section will meet during the XXIst Conference (1961). No formal Commission meetings were held during 1960.

The task group on Gas Chromatography met during the Symposium on Gas Chromatography in 1960.

An International Congress on Analytical Chemistry was organized in Budapest in April 1961 by the Hungarian Academy of Sciences under the patronage of the Union. The meeting was most successful both scientifically and socially, and wide field of analytical chemistry was covered. The plenary lectures were given by Profs. I. P. Alimarin (USSR), R. Belcher (UK), G. Charlot (France), C. Duval (France), L. Erdey (Hungary), L. Gordon (USA), J. Heyrovsky (CSSR), K. Jacimirskii (USSR), W. Kemula (Poland), E. Schulek (Hungary), S. Veibel (Denmark), P. W. West (USA) and W. F. K. Wynne-Jones (UK).

It should be recorded that the Talanta Medal, which is given for outstanding services to Analytical Chemistry, was awarded to Prof. F. Feigl during the Congress, for his work on the development of spot-tests.

Analytical Chemistry will be represented in the Montreal Congress by small Symposia on the analysis of metals and minerals, on the analytical chemistry of the less common metals and on the analysis of pesticide residues.

The Section considers that it is time that analytical chemistry should be allotted the main share in an official Union Congress held in conjunction with a Conference.

As detailed later in this report, an International Symposium on Microchemistry, organized by the Metropolitan Microchemical Society under the auspices of the Union, will be held in Pennsylvania State University (USA), shortly after the XXIst Conference.

Publications

Six reports from the Commissions, which were approved by the Section during the XXth Conference, were published in the first issue of "Pure and Applied Chemistry", which appeared belatedly sometime near the beginning of 1961. These are detailed later under Commission activities. The Report of Prof. KORTÜM, presented in Munich in 1959, remains unpublished. The Section expresses the earnest hope that the Publications Committee will find a formula to avoid these frustrating delays in future.

COMMISSION ACTIVITIES

V.1 Commission on Analytical Reactions

Of the Titular members, Prof. P.W. WEST (USA, Chairman), Mme T. DUPUIS (France), Prof. J.HOSTE (Belgium), Prof. M.ISHIBASHI (Japan), Mlle Y.RUSCONI (Switzerland), Prof. H.WEISZ (Germany) and Prof. F.J.WELCHER (USA) are due to retire this year, leaving Mr.W.C.JOHNSON to continue as Secretary. Associate members Profs. F.FEIGL (Brasil), N.D.CHERONIS (USA) and S.VEIBEL (Denmark) retire, leaving Dr. E.SAWICKI (USA) and Dr. M.PESEZ (France), Dr. D.GOLDSTEIN (Brazil), Dr. J.R.AMARAL (Brazil) and Dr. A.K.MUKHERJI (USA) to continue until 1963.

The Commission has completed the Fifth Report on new Reagents and Reactions in Inorganic Analysis, and the Report will be ready for submission to the printers after the XXIst Conference. This Report brings the literature of test reactions for inorganic substances up-to-date and includes selected information from the four previous reports. From enquiries received, the Report is eagerly awaited by research workers throughout the world.

Further studies of reactions used for inorganic analysis can now be deferred. Similar studies must now be directed towards reactions used in organic analysis. The nature of the Commission has already undergone changes in emphasis, following the approval of future plans given during the XXth Conference in 1959. With the wholesale retirement of Commission members after the XXIst Conference, the Commission will be reorganized to include more members whose specialities lie in this field of organic analysis.

V.2 Commission on Microchemical Techniques

The present Commission membership is stable until 1962. Titular members are Dr. A.STEYERMARK (USA, Chairman), Dr.W.SCHÖNIGER (Switzerland, Secretary), Drs. S.A.HÖLZEL, H.SPITZY (Austria), J.KÖRBL (CSR), R. LEVY (France), A.J.LLACER (Argentina), R.J.MAGEE (UK). Associate members are Prof. A.A.BENEDETTI-PICHLER (USA) and Mr. G.INGRAM (UK).

Three reports made by this Commission in its present and previous membership have been published in the first issue of "Pure and Applied Chemistry" (pages 143, 169 and 171).

Following publication of a "Recommended list of test substances for the microdetermination of carbon and hydrogen", a similar list has been prepared for the microdetermination of nitrogen by the DUMAS and KJELDAHL methods. This list can be used to determine the universal applicability of a given method or modification which has already been described or which may be developed in the future. It includes compounds with a variety of structures, elements present and percentages of nitrogen. The list has been submitted to the Section for approval and further transmission.

Further plans for the work of the Commission include:

(a) extension of the lists of recommended test substances to cover all commonly analysed elements and groups;
(b) recommendations on the evaluation of methods;
(c) a study of the extent of teaching in microchemistry in Universities and Colleges with the intention to stimulate interest in this subject and to secure more widespread teaching;
(d) a study of difficulties encountered in various analyses and the solution of such difficulties. Such information should be given general diffusion formally or informally.

A recent major task of the Commission has been to collaborate with the Metropolitan Microchemical Society of New York in the organization of the International Symposium on Microchemistry, which will be held at the Pennsylvania State University, Pennsylvania, USA, from 13 to 18 August 1961. From the papers already submitted, this meeting will be truly international in representation and should prove extremely valuable for the future development of microchemistry. It is intended to organize further symposia along similar lines at intervals of 3–4 years.

V.3 Commission on Nomenclature

Titular members due to retire in 1961 are Profs. F. Burriel-Marti (Chairman, Spain) and H. Malissa (Austria); continuing until 1963 are Prof. I.M. Kolthoff (USA) and Drs. A.M.G. Macdonald (Secretary, UK), P. Rocquet (France) and D. Ambrose (UK). Associate members till 1963 are Profs. I.P. Alimarin (USSR), M. Ishibashi (Japan) and, till 1964, Profs. L. Erdey (Hungary), R. Pribil (CSR) and Dr. K.H. Obst (Germany).

Dr. G. Wernimont (USA) and Mr. A.H. Dodd (UK) have prepared a definitive version of a simplified list of terms for use in Sampling, a project carried out by the pre-1959 Commission members, and this list is now ready for general distribution.

The work of the independent task group on Nomenclature in Gas Chromatography under the chairmanship of Dr. Ambrose has continued. The group consists of Prof. A.I.M. Keulemans (Netherlands) and Drs. A.T. James (UK), E. Kovats (Switzerland), C. Rauit (France), E. Bayer (Germany) and F.H. Stross (USA). The principal recommendations on this Nomenclature were published in the first issue of "Pure and Applied Chemistry" (p. 177).

The appearance of these recommendations has met with widespread approval and they were discussed at the 1960 Symposium on Gas Chromatography. Certain amendments have been suggested and are now under discussion.

The subject of the nomenclature of ethylenediaminetetraacetic acid and its analogues has continued to vex the Commission. The necessary information has now been collected and a decision should be reached in Montreal. This question is related to the general problem of classification in titrimetric analysis which is under discussion. The classification of methods in analytical chemistry is also being studied.

A series of recommendations on terminology in solvent extraction has been prepared in Russian and English versions by Prof. Alimarin and has been distributed for comment.

Problems in the terminology and symbols for the expression of concentrations in analytical work have been summarized by Prof. Burriel-Marti for further discussion.

Most of the above-mentioned topics should be finalized during the XXIst Conference.

V.4 Commission on Spectrochemical and other Optical Procedures

Titular members who continue in office until 1963 are Dr. A.C. MEMZIES (Chairman, UK), M.E. LOUEILLE (Secretary, France), Prof. S. MANDELSTAM (USSR) and Dr. B.F. SCRIBNER (USA). Due to retire in 1962 are Prof. V. FASSEL (USA), Father Dr. E.W. SALPETER (Italy); retiring in 1961 are Profs. G. DUYCKAERTS (Belgium) and H. KAISER (Germany), as well as associate members Dr. W.R. BRODE (USA) and Prof. M.G. MELLON (USA).

A report by Dr. MENZIES on the calibration of wavelength and photometric scales of non-recording spectrophotometers has been published in the first issue of "Pure and Applied Chemistry" (p. 147). The work of the Commission is proceeding satisfactorily along the lines mentioned in the report of the XXth Conference.

No formal report has yet been received from this Commission owing to Dr. MENZIES' absence abroad.

V.5 Commission on Electrochemical Data

Of the titular members, Profs. P. DELAHAY (Chairman/Secretary, USA), W. KEMULA (Poland), G. SEMERANO (Italy) and N. TANAKA (Japan) and Dr. R. BATES (USA) retire this year, leaving Prof. G. KORTÜM (Germany) and Dr. A. HICKLING (UK) to continue until 1963. Of the associate members, Prof. M. ISHIBASHI (Japan) and Dr. J. PROSZT (Hungary) retire this year, leaving Prof. G. CHARLOT (France) and Drs. H. GERISCHER (Germany), P. ZUMAN (CSR) to continue until 1963. Dr. A. PERRIN (Australia) serves as an associate member until 1965. Associate members from the Electrochemistry Commission of the Physical Chemistry Section are Dr. M. POURBAIX (Belgium), Dr. W.J. HAMER (USA) and Prof. G. VALENSI (France).

Four areas are covered in the activities of the Commission:

(a) dissociation constants of weak acids and bases and polarographic data;
(b) the definition of pH in a variety of media;
(c) selection of proper reference electrodes in non-aqueous solvents and molten salts;
(d) nomenclature in electroanalytical chemistry.

A detailed compilation of dissociation constants of organic acids prepared by Prof. G. KORTÜM is in course of publication. Dr. PERRIN is now compiling the dissociation constants of inorganic acids and inorganic and organic bases. Further work is planned on the dissociation and ionization constants of weak electrolytes in non-aqueous solvents and molten salts.

A list of polarographic data has been published in book form by Prof. SEMERANO and his colleagues, and further work on these lines is contemplated. It is expected that agreement will be reached in Montreal on the format for future compilations.

Recommendations for an operational definition of pH were prepared jointly by this Commission and the Commission on Electrochemistry and were published in the first issue of "Pure and Applied Chemistry" (p. 163). Dr. BATES is now continuing this work for non-aqueous media.

Future plans include the preparation of recommendations for suitable reference electrodes in non-aqueous solvents and molten salts; this matter is of pressing importance in view of the amount of current work in these media.

A nomenclature of electroanalytical methods has been prepared by Profs. DELAHAY, CHARLOT and LAITINEN and has been widely circulated for comment. Further work on nomenclature is planned.

In conclusion, the Commission has been active in several areas in which international agreement is most desirable. This activity has in no way over-

lapped with that of the Commission on Electrochemistry of the Physical Chemistry Section.

V.6 Commission on Equilibrium Data

Titular members Profs. G. SCHWARZENBACH (Chairman/Secretary, Switzerland), W. FEITKNECHT (Switzerland), D. N. HUME (USA) and H. M. N. H. IRVING (UK), and Drs. J. C. HINDMAN (USA) and I. LEDEN (Sweden) retire this year. Associate members Profs. T. TAKAHASHI (Japan) and K. B. YATSIMIRSKII (USSR) also retire; continuing until 1963 are Profs. J. BJERRUM (Denmark), A. E. MARTELL (USA), A. RINGBOM (Finland) and L. G. SILLÉN (Sweden).

This Commission has been one of the most productive in the Union, and it is to be hoped that the membership will not have to be radically altered in 1961. Since 1956 all the business of the Commission has been carried on by correspondence, but this year the Commission will meet in order to prosecute its business more expeditiously.

The value of the tables of Stability Constants prepared by the Commission has been universally recognized and Part I (Organic Ligands) published by the Chemical Society has been out of print for some months. Moreover much new material has appeared in the literature. The manuscript for a second edition of both Parts I and II (Inorganic Ligands) is now being prepared. The latter part has been collected by Prof. SILLÉN, who has sent large supplementary lists of constants to all Commission members. Part I is being extended by Prof. MARTELL with the assistance of Prof. SCHWARZENBACH and Dr. ANDEREGG. The appearance of this new edition is eagerly awaited by all those to whom the previous edition has been invaluable.

A critical compilation of solubility data of metal hydroxides is in preparation by Prof. FEITKNECHT and will be distributed for approval in 1961.

Conclusion

The work of the Section appears to have progressed satisfactorily during the last two years. The steps taken at Munich in 1959 to enhance the efficient working of the Section have been successful and the experience gained points the way to some further minor reforms.

In conclusion, the President wishes his successor, Prof. DUYCKAERTS, every success in his direction of the work of the Section.

SUMMARY FINAL REPORT

of the Section President, 1959–1961

The President in this final report wishes to place on record his sincere appreciation of the whole-hearted support which he has received from his Section Committee and from the Section in general.

The various administrative difficulties which have beset the Section during the past few years have been solved to the satisfaction of at least the majority of members. Certain problems outside the immediate control of the Section itself have proved more intractable.

Section Committee Members

President R. BELCHER (GB) retired after the XXIst Conference. He was to have been succeeded by Prof. G. DUYCKAERTS (Belgium) who had been unanimously elected by the Section. Unfortunately, Prof. DUYCKAERTS was

forced to withdraw owing to ill-health. During the XXIst Conference, Prof. H. MALISSA (Austria) was unanimously elected to take his place. Elections were held in advance of the Conference; Prof. R. BELCHER (GB) and G. CHARLOT (France) were elected for 2-year terms, Prof. BELCHER to serve as Vice-President during that time. Prof. P. DELAHAY (USA), W. FISCHER (Germany), R. PRIBIL (Czechoslovakia) and N. TANAKA (Japan) were elected for 4-year terms (1961–1965). During the XXIst Conference Prof. L. GORDON (USA), the Section Secretary, submitted his resignation because his recent appointment as Dean of Graduate Studies at the Case Institute of Technology left him insufficient time to devote to the affairs of the Section. It was proposed that Dr. P.N. DEGENS (Netherlands) be asked to serve as Secretary and Dr. DEGENS has accepted. Profs. I.P. ALIMARIN (USSR) and P.W. WEST (USA) continue to serve until 1963.

Election of Section Committee Procedure

The procedure outlined in the Comptes Rendues of the XXth Conference (p. 262) has now been submitted to proper test during the above election. After these elections, the procedure was confirmed with the following addition: the procedure allows for the election of three members without regard to geographical distribution, but it was decided that no region mentioned in the representation can have more than one representative above the specified number.

Meetings and Symposia

The whole Section met during the XXIst Conference (1961). No formal Commission meetings were held during 1960.

The task group on Gas Chromatography met during the Symposium on Gas Chromatography in Edinburgh in 1960.

A Congress on Analytical Chemistry was organized in Budapest in April 1961 by the Hungarian Academy of Sciences under the patronage of the Union. The meeting was most successful both scientifically and socially, and a wide field of analytical chemistry was covered. The plenary lectures were given by Profs. I.P. ALIMARIN (USSR), R. BELCHER (GB), G. CHARLOT (France), C. DUVAL (France), L. ERDEY (Hungary), L. GORDON (USA), J. HEYROVSKY (CSSR), K. YATSIMIRSKII (USSR), W. KEMULA (Poland), E. SCHULEK (Hungary), S. VEIBEL (Denmark), P.W. WEST (USA) and W.F.K. WYNNE-JONES (GB).

It should be recorded that the Talanta Medal, which is given for outstanding services to Analytical Chemistry, was awarded to Prof. F. FEIGL during the Congress, for his work on the development of spot-tests.

Analytical Chemistry was represented in the Montreal Congress by small Symposia on the analysis of metals and minerals, on the analytical chemistry of the less common metals and on the analysis of pesticide residues.

The Section considers that it is time that analytical chemistry should be allotted the main share in an official Union Congress held in conjunction with a Conference.

An International Symposium on Micro-Chemistry, organized by the Metropolitan Microchemical Society under the auspices of the Union, was held in Pennsylvania State University (USA) shortly after the XXIst Conference, on 13–18 August, 1961. The meeting was a pronounced success in allowing contact between American and European scientists. Plenary lectures were given by Profs. H. LIEB (Austria), A.A. BENEDETTI, PICHLER (USA), R. BELCHER (GB) and N. CHERONIS (USA).

The Section places on record its sincere thanks to the organizers of the above meetings.

In 1962, an International Symposium on Analytical Chemistry will be held in Birmingham, England, under Union auspices to celebrate the 70th birthday of Prof. F. FEIGL (Brazil), who has been a leading member of the Analytical Chemistry Section for many years.

A Symposium on Analytical Chemistry will be held in London in 1963 as part of the IUPAC Congress and the Section Committee has been invited to suggest programme topics.

Prof. KEMULA of the Polish Delegation had proposed that a Congress on Analytical Chemistry be held in Warsaw in 1963, to follow the London Symposium. The Committee felt, however, that the projected scope of the Polish Congress would cause it to be competitive rather than complementary and proposed that the Congress be held later (in 1964 at the earliest). The Committee welcomed the idea that a complete Congress might be devoted to analytical chemistry along the lines of the last full Congress held in Lisbon in 1956.

An international conference on spectroscopy will be held in the University of Maryland during the period 18–22 June, 1962. The conference will be entitled the Xth Colloquium Spectroscopicum Internationale and has been recommended for sponsorship by IUPAC.

Publications

The various Section Reports which were completed after the XXth Conference and which were listed in the Comptes Rendus (p. 271) finally appeared in Pure and Applied Chemistry, during the first half of 1961. Among these was the extensive compilation of dissociation constants of organic acids in aqueous solution prepared by Prof. KORTÜM and his collaborators. Publication of the Tables of Data for Absorption Spectrophotometry prepared by the Commission on Optical Data under Prof. DUYCKAERTS' leadership is expected in the near future.

The Section records its sincere gratitude to the members involved in the preparation of all these reports.

COMMISSION ACTIVITIES

V.1 Commission on Analytical Reactions

During the XXIst Conference, the membership of the Commission was reorganized, because the terms of office of all the Titular members except Mr. W.C. JOHNSON (GB), came to an end in 1961.

The new membership of the Commission is: Prof. S. VEIBEL (Denmark), Chairman, Mr. W.C. JOHNSON (GB), Secretary, Profs. N.D. CHERONIS (USA), F. FEIGL (Brazil), F.J. WELCHER (USA), and Drs. M. JURECEK (Czechoslovakia), A.K. MUKHERJII (USA), M. PESEZ (France). Associate members are Drs. J.R.A. AMARAL (Brazil), V. ANGER (Austria), D. GOLDSTEIN (Brazil), E. SAWICKI (USA), W.I. STEPHEN (GB). The terms of office of Drs. AMARAL and GOLDSTEIN end in 1963; all others are for the period 1961–65.

During the Conference the Fifth Report on New Reagents and Reactions in Inorganic Analysis was discussed further; the final report will be ready for publication by the end of 1961. This report brings the literature of test reactions for inorganic substances up-to-date and includes selected information from the four previous reports. From enquiries received, the Report is eagerly awaited by research workers throughout the world.

Further studies of reactions used in inorganic analysis can now be deferred. Similar studies will now be directed towards reactions used in organic analysis. The new membership of the Commission has been designed with this end in view. Prof. FEIGL has prepared a scheme for the compilation

of a report on qualitative reactions of organic compounds. This scheme has been approved by the Commission and work is now in progress.

V.2 Commission on Microchemical Techniques

The membership of the Commission is: Dr. A. STEYERMARK, Chairman (USA), Dr. W. SCHÖNIGER, Secretary (Switzerland), with, as Titular members until 1966, Drs. S. HÖLZEL (Austria), J. KÖRBL (Czechoslovakia), R. LEVY (France), and as Titular members until 1963, Drs. A. LLACER (Argentina), R. MAGEE (GB) and H. SPITZY (Austria); associate members are Mr. G. INGRAM (GB) until 1966 and Prof. A.A. BENEDETTI-PICHLER (USA), until 1963. Drs. GEL'MAN (USSR), and VECERA (Czechoslovakia) are to be invited as Associate members.

The series of recommendations on Test Compounds for Micro-elementary Analysis has been continued and recommendations for the determination of nitrogen by the DUMAS and KJELDAHL methods, and for the determination of halogens and sulphur have been prepared and are ready for publication.

A proposal has been made to the Commission by the Österreichische Gesellschaft für Mikrochemie and by the Metropolitan Microchemical Society that the symbol *e* should be used to designate 10^{-15} units in the nomenclature of weights and volumes, etc. This was to be done in honour of Prof. EMICH. The proposal met with qualified approval by the Commission, and consultation with the Section Committee and with other Sections is planned.

The Commission intends to collect and report on sources of error in micro-elementary and functional group analysis, so that such information would be generally available to all microanalytical laboratories.

Certain members of the Commission will participate in a study group on inorganic microchemical problems.

V.3 Commission on Nomenclature

Prof. F. BURRIEL-MARTI (Spain) continues as Chairman until 1963; Dr. D. AMBROSE (GB) accepted the Secretaryship until 1963, in place of Dr. A.M.G. MACDONALD, who resigned. Titular members until 1963 will be Profs. ALIMARIN (USSR), G. CHARLOT (France), L. ERDEY (Hungary), R. PŘIBIL (Czechoslovakia), E.B. SANDELL (USA) and Dr. E. BAYER (Germany).

The Simplified List of Terms for use in Sampling prepared by Dr. G. WERNIMONT (USA) and Mr. A.H. DODD (GB) is now in its final version and will be ready for publication during 1962.

The independent group working under Dr. AMBROSE on Nomenclature in Gas Chromatography has considered amendments to the proposals made and published in Pure and Applied Chemistry, vol. I, p. 177.

Some consideration has been given to methods of expressing concentration in analytical chemistry, but it has been decided not to proceed further with this topic.

The subject of the nomenclature of ethylenediaminetetraacetic acid has continued to vex this Commission. Following the recommendation of "complexan" rather than complexone or chelon to designate polyamino-polycarboxylic acids and related compounds, made by the Section Committee in 1959, several objections had been made. The matter was therefore discussed by the Commission and by the entire Analytical Section during the XXIst Conference and the following recommendations were given unanimous approval.

(1) Terms such as Complexone, complexan, Sequestrene, Versene, Trilon, Chelon and others used to describe aminopolycarboxylic acids and similar reagents are to be abandoned. The universal practice of designating particular compounds such as EDTA, NTA, CDTA, etc. should be retained.

(2) Titration processes which use a complexing agent of any kind should be termed "compleximetric titrations". Further classification is unnecessary and undesirable. When a specific titrant has to be designated, the titration process is referred to as "compleximetric titration with EDTA, cyanide, oxine, etc.".

At a later date specific recommendations will be made regarding the terminology to be used for the classification of other branches of titrimetric analysis. There was agreement that the use of such terms as acidimetry, alkalimetry, iodimetry, iodometry, thiosulfatometry, permanganometry, etc. was also unnecessary and undesirable. Some of these terms have opposite meanings in different countries. The Analytical Chemistry Section recommended the ultimate adoption of the simplest possible terminology prior to the IUPAC meeting to be held in London in 1963.

It was decided to reconstitute the commission to include members qualified to deal with nomenclature of solvent extraction and the above membership was designed for this purpose. This project has been allotted two years for its completion.

V.4 Commission on Spectrochemical and other Optical Procedures

Dr. A.C. Menzies, Chairman (GB) and M.E. Lœuille, Secretary (France), Prof. S. Mandelstam (USSR) and V. Fassel (USA) and Dr. B.F. Scribner (USA) continue in office until 1963; Dr. E.W. Salpeter (Italy) continues until 1962; Prof. H. Kaiser (Germany) has been elected to serve a second term until 1965. Drs. L.S. Birks (USA), G. Pomey (France), H. Guyer (Switzerland), H. Svejda (Austria) and G. Kortüm (Germany) are to be invited to join the Commission.

The meetings held during the XXIst conference were inconclusive owing to the absence of several members who were ill. A concise format for the description and publication of optical emission spectrographic methods of analysis has been circulated for comment and awaits approval by the whole commission.

Satisfactory progress has been made on the following projects: (1) Nomenclature, symbols and units with special reference to analytical emission spectroscopy; (2) Critical compilation of the supply and availability of standard samples; (3) Compilation of sensitivities of detection representative of a particular combination of spectral excitation source conditions. A proposal for the standardization of methods of reporting fluorescence emission spectra has been received from the Section Committee, and has been circulated to the Commission. Enquiries are to be made regarding the present status of standard emission wavelengths for the vacuum ultraviolet region. The possibility of compiling a critical collection of misidentifications in wavelength tables is to be explored, because it is well-known that certain wavelength tables contain errors in line assignments.

V.5 Commission on Electrochemical Data

Prof. P. Delahay (USA) continues as Chairman-Secretary until 1963. Titular members until 1966 are Profs. G. Kortüm (Germany), I.M. Kolthoff (USA), W. Kemula (Poland), N. Tanaka (Japan), and Drs. L. Badoz-Lambling (France) and H. Gerischer (Germany); Dr. A. Hickling con-

tinues until 1963. Associate members until 1963 are Prof. G. CHARLOT (France) and Dr. P. ZUMAN (Czechoslovakia). Associate members representing the Commission on Electrochemistry of the Physical Chemistry Section are Prof. G. VALENSI (France) and Drs. M. POURBAIX (Belgium) and W.J. HAMER (USA). Elected as Associate members until 1965 are Dr. R. BATES (USA), Prof. H.A. LAITINEN (USA), Dr. R.A. ROBINSON (USA), Dr. E. VIANELLO (Italy) and Dr. A. PERRIN (Australia).

The compilation of dissociation constants of organic acids prepared by Prof. KORTÜM has been published. This valuable work will be continued for inorganic acids and organic and inorganic bases by Dr. PERRIN. The pattern of the compilation will be the same as that used by Prof. KORTÜM.

The report on nomenclature and standardization of pH measurements was published in "Pure and Applied Chemistry", vol. I, p. 163; the report will later be published in French, Italian and Japanese versions.

The report on the classification and nomenclature of electro-analytical methods which has been published in English, French, Italian and Japanese versions, is to be revised in the light of comments received. It will then be submitted for publication in Pure and Applied Chemistry.

The compilation of polarographic data is being continued by Prof. SEMERANO and Dr. VIANELLO with the support of the Commission.

A Sub-Committee has been appointed to examine critically methods for the determination of electrochemical data in non-aqueous solvents. A similar study will be made for molten salts.

A compilation of kinetic parameters for electrode processes prepared by Prof. TANAKA has been submitted to the Electrochemistry Commission of the Physical Chemistry Section, in order to avoid duplication of effort between the two commissions.

V.6 Commission on Equilibrium Data

The terms of office of the Titular members came to an end during the XXIst Conference. The new membership of the Commission will be Prof. D.N HUME, Chairman-Secretary (USA) with, as Titular members, Profs. L.G. SILLEN (Sweden), J. BJERRUM (Denmark), A.E. MARTELL (USA), F. FREISER (USA), K.B. YATSIMIRSKII (USSR) and Drs. J.C. HINDMAN (USA) and D. DYRSSEN (Sweden); and as Associate members, Prof. W. FEITKNECHT (Switzerland), G. SCHWARZENBACH (Switzerland), A.J. RINGBOM (Finland), H.M.N.H. IRVING (GB), T. TAKAHASHI (Japan), and Dr. I. LEDEN (Sweden). The terms of office of Prof. HUME and Dr. HINDMAN finish in 1963; the other terms of office are for the period 1961–65.

The value of the Tables of Stability Constants which have been prepared by this Commission has been universally recognized and Part I of the first edition published by the Chemical Society has been out of print for some months. A second edition of both parts is now being prepared. For the inorganic part of the Tables, Prof. SILLEN has prepared and distributed supplementary lists of data. He has also supplied a collection of data on oxidation-reduction equilibria, which might be incorporated with the Tables of Stability Constants as an appendix. For the organic part of the Tables, Prof. MARTELL has prepared a revised edition which is much larger than the first edition and is complete to 1960. The manuscripts of both parts will be ready for publication in 1962 and it is expected that they will be published in one complete volume.

The collection of selected values of solubility products which has been prepared by Prof. FEITKNECHT has been approved by the Commission and will be ready for publication by the end of 1961.

Conclusion

In general, the work of the Section through its various Commissions has progressed well as is evidenced by the number of reports which have already been published in the new Union Journal, "Pure and Applied Chemistry". The various steps taken to enhance the efficient working of the Section are now bearing fruit. The President expresses his thanks to all members of the Section who, by their industry, have contributed to the progress made. Finally, he wishes his successor, Prof. H. MALISSA, every success in his future direction of the work of the Section.

R. BELCHER, President

VI. APPLIED CHEMISTRY SECTION

REPORT ON ACTIVITY

Although this present report is intended primarily to cover the working of the Section during the past two years, it is appropriate that comment first be made on the development of the Section since its inception just ten years ago.

During that period this Section has very considerably widened its range of interests and influence. As it is composed of Divisions, mostly representing industries or groups of industries, the growth of the Section has been evidenced by an increase in the number of those Divisions (there are nine at present) and by requests for the formation of still more. This very desirable and encouraging development has now reached a stage at which it threatens to become a financial embarrassment to the Union. It is understandable, therefore, that much thought has been given to ways by which a proper balance may be secured between the further increase in activity of the Section and the available financial support which the Union can provide. Furthermore, if development of the Applied Chemistry Section is to meet the requirements of Industry, it is apparent that industry itself will need to provide increasing financial support. It is to be hoped, therefore, that the widest publicity will be given to the appeal fund which the Treasurer of the Union has opened for that very purpose.

The experience gained during the ten years of the Section's existence has indicated the diversity of the requirements of the different industries. This experience has enabled a better judgement to be made of the limits within which such activities can be justifiably reconciled with the objectives of the Union. This has led to the preparation of a document more clearly defining the objectives and functions of the Section and its constituent Divisions within the framework of the Union. The essential features of the document, which has been prepared with the collaboration of the Chairmen of the Divisions, are incorporated in this report.

Objectives of the Section

The stated objectives of the Union, namely "the advancement of chemistry in all its aspects", including the holding of conferences, congresses and discussions, are all embraced by the Applied Chemistry Section. Nevertheless the primary purpose of this Section is to serve industry in all those ways by which chemistry can help foster international understanding and assist international trade.

It is not surprising therefore that the structure of this "Applied" Section is somewhat different from that of the other Sections concerned with "Pure" chemistry. The former differs from the latter in having Divisions, each mostly serving one industry, but some serving several.

Functions of the Divisions and attached Commissions

The activities of these Divisions cover a wide range; from matters of a highly chemical nature to those seemingly as simple as the meaning of technical terms. They may be sub-divided under the following headings:

(1) The establishment of international agreement within the particular industry on all appropriate matters concerned with its raw materials and products. Such matters include symbols, terminology, units, abbrevia-

tions, representation of data and characterization of standards (substances and reactions).

(2) The establishment of international agreement on methods of chemical analysis, and of other types of testing, of materials and products of the industry. This usually entails comparison, in a number of selected laboratories, of two or three generally accepted methods using samples circulated between the workers. The results enable one method to be chosen and recommended for international use in the industry.

(3) Consideration and recommendation on other matters which concern the industry and which can only be studied appropriately at the international level.

Divisions may of course be active in any or all of the above ways and, when appropriate, they may form Commissions for some special study.

Some Divisions may and often do have close links with other Divisions in certain aspects of their work. In such cases it is appropriate to form joint Commissions. Indeed joint Commissions may similarly be formed between Divisions and other Sections.

For reasons of economy it has been the practice to date, when at all possible, for the members of Division Committees to form themselves (with associate members, when desirable) into Sub-Committees to study the matters listed under Item 1 (above). The following Divisions have adopted this practice: "Plastics and High Polymers", "Organic Coatings", "Oils and Fats", "Paper, Pulp and Board" and "Toxicology and Industrial Hygiene".

Applied chemical analysis (Item 2), on the other hand, has usually justified the formation of Commissions. Three Divisions have formed the following Commissions for that purpose.

Divisions	*Commissions*
Food Division	"Trace Elements in Food"
	"Food Additives"
Fermentation Industries Division	"Determination of Fusel Oils"
	"Characterization of Dried Yeast"
Paper, Pulp and Board Division	"Cellulose Analysis"

The Toxicology and Industrial Hygiene Division is also very much interested in analysis and is applying it to the establishment of the maximum allowable concentrations of industrial toxic substances both in the atmosphere and in biological media. The Committee of this Division is studying the methods of determination without forming Commissions.

Item 3, which concerns the wider and less easily defined matters, applies more particularly to those Divisions which have more than one industrial interest, such as the "Water, Sewage and Industrial Wastes" and "Pesticides" Divisions. The former has made a study of, and is issuing a report on, "Re-use of water in Industry—a contribution to the solution of effluent problems", while the latter, apart from attempting to rationalize methods of detecting and measuring pesticide residues (which may fall under Item 2), is concerning itself with recommendations on legislative control of pesticides.

Geographical Distribution of Representatives

In any truly international organization it is important that proper international representation on the various Committees should be secured. On the other hand, it is equally important that the Committee members and officers should be of suitable standing to ensure that the best informed minds are brought to bear on the matters submitted for discussion and decision. These two requirements are often not easy to reconcile. As the President of the Union has already mentioned this matter in his report, I need not dwell on

it here. Suffice it to say that in the Applied Chemistry Section clearly there must be a greater preponderance of Committee members from the more industrialized countries. The other countries may nevertheless ensure a measure of representation by the appointment of National Delegates who are invited to contribute to discussions although they do not have a vote.

Modification of the structure and organization of the Section as a result of its present size and possible further growth

The natural growth of the Applied Chemistry Section has already resulted in financial problems as has been explained; it also leads to questions of organization. Possible changes in the structure of the Section have therefore been the subject of discussion for some time and have led to the suggestions outlined in "Information Bulletin" No. 11, pages 31 and 32. That tentative scheme has been widely circularized, firstly to members of the Section, then to members of the Union and more recently, via the Secretary General, to the various National Adhering Bodies with a request for comments. As a result, it is to be hoped that a résumé of the various comments on ways by which the Applied Chemistry Section may better satisfy the requirements of Industry may be available for discussion at the Montreal Conference.

FUTURE STRUCTURE OF THE APPLIED CHEMISTRY SECTION

Report of Meetings (Montreal 1961) of the Applied Chemistry Section and the Council of the Union to discuss the above subject

At the *Council Meeting* on 2 August, the essential features of the proposed new structure of the Applied Chemistry Section (appendix I) were outlined by the President of the Section and an invitation extended to anyone interested to attend an "*Open*" *Section Meeting* the next day to discuss the matter in detail. At that meeting the following were present: J.H. Bushill, President, R. Truhaut, Vice-President (France), F.J. Van Antwerpen (USA), F.M. Arnold (USA), J. Treboux (Switzerland), H. Lundin (Sweden), Kyle Ward, Jr. (USA), Wilfred Gallay (Canada), V.A. Kargin (USSR), N.P. Tajrin (USSR), J.G. Gage (GB), G. Dring (GB), G.M. Kline (USA), Robert G. Keenan (USA), H.E. Stokinger (USA), H.B. Elkins (USA), Jan A.A. Ketelaar (Netherlands), Maria E. Alessandrini (Italy), H.J. Bunker, Hon. Secretary (GB).

After quoting the "Objectives of the Section and Functions of the Divisions" from the Report of the Applied Chemistry Section 1959–61, the President stated that increasing demands had been received from industries for representation in the Union. Consequently consideration had been given to practical ways of satisfying the apparent need of industry.

The stages were then outlined through which the conception of a reorganization had developed. This was illustrated by reference to (a) Information Bulletin No. 11, pp. 31 and 32, (b) the report of the Applied Chemistry Section 1959–1961, pp. 174 and 175 and (c) the Information Bulletin No. 14a, pp. 25 to 27. The latest form which the suggested new structure had taken was outlined in a document circulated immediately before the Conference (an abstract is given in appendix I).

The significant features of this new scheme were reviewed indicating its special means by which the Section could increase its contacts with a wider range of industries but with limited expense to the Union.

Various "Adhering Bodies" had previously been requested to comment on the earlier scheme (as given in Information Bulletin No. 11, pp. 31–32) which differed from the latest scheme only in not including elected members

to give improved geographical representation. As a result valuable detailed statements were received from the Deutscher Zentralausschuss für Chemie, the Committee on Industrial Chemistry in the Division of Chemistry and Chemical Technology of the U.S. National Research Council and the British National Committee for Chemistry. These documents (see appendixes II, III, IV) were read to the meeting as a contribution to the general discussion which followed.

Dr. ARNOLD remarked that the question of elected titular members had not been discussed by the U.S. National Research Council Committee on Industrial Chemistry. However, in his opinion, such membership would be favoured by that Committee, for it would allow representatives of the less industrialized countries to take an active part in the broader aspects of the work of the Section. This should further the world-wide development of Chemistry which is one of the objectives of IUPAC.

The President mentioned that some provision is already made for the less industrialized countries to have representatives in the Divisions although such representatives are non-voting.

Dr. GALLAY remarked that it should be possible, as regards the appointment of elected Section Committee members, to find them from amongst the existing Division Committees, thus minimizing expense.

Some amplification of the functions of an Assistant Secretary was requested by Mr. DRING. It was indicated that no concrete ideas had been formulated on that matter; the inclusion of an Assistant Secretary was purely a provision for possible increase in the work of the Section.

In order to clarify the general views of the meeting the proposed new structure of the Section was considered under three headings:

(1) The membership of the Section Committee; (2) the distribution of the Titular Membership of the Committee; (3) the desirability of splitting the Section into two Sections.

There was general agreement on item (1), as also was there agreement on (2) for it was realized that the distribution of titular membership would in any case be dependent upon finances which may vary from time to time.

Item (3) led to most discussion which centred round the points already mentioned in the documents from the three Adhering Bodies, particular reference being made to the suggestion that Divisions be arranged in two groups, namely those appertaining to "Food" and those more conveniently termed "Industrial Chemistry".

The views expressed are summarized as follows:

The Toxicology and Industrial Hygiene Division would not find a place in the first named section as hitherto it has not been concerned with nutritional problems (Prof. TRUHAUT).

There seems to be no reason to effect a split, unless the present size and diversification of the Section's interests are proving, in the opinion of the officers of the Section, too unwieldy for efficient working (Dr. GALLAY).

The officers indicated that they were not of the opinion that the Section was at the present time unwieldy.

If there are sound technical and organizational reasons for splitting the section, financial considerations should not be paramount (Dr. ARNOLD).

A parallel was drawn between two related sections (Organic Chemistry and Biological Chemistry, which exist as separate sections) with certain Divisions of the Applied Chemistry Section. This thought led ultimately to the comment that all Divisions might become Sections (Dr. ARNOLD, Dr. GAGE).

It was suggested that some industries might consider a split desirable since it might place their representation at a higher level in the Union (Dr. ARNOLD).

An alternative means of achieving a more balanced representation of Applied and Pure Chemistry on the Bureau of the Union without splitting the Section would be by increasing the number of representatives of Applied Chemistry on that body (Dr. KLINE).

The U.S. National Research Council's appropriate Committee had no very strong views on the splitting of the Section and would accept the considered opinion of the Section (Dr. ARNOLD).

The President, in closing the meeting, then thanked those present for their helpful comments which the Section Committee would take into consideration in compiling a report and a recommendation for presentation to the Council of the Union.

Section Committee Meeting

Subsequently the Section Committee met in closed session, 4 August, to summarize the various views expressed and to make a recommendation to Council as to future action.

At that meeting the difficulties which would result from a splitting of the Section were further reviewed. In doing so, it was pointed out that the separation of those Divisions representing industries having a biological basis from the other Divisions might seem logically feasible, but in fact such a splitting would prove to be very artificial. Several representatives indicated that their Divisions could appropriately be placed in both of the suggested applied sections.

The considered view of the Section Committee was that:

(a) It appreciated the desirability of increased numerical representation of Applied Chemistry both in the Union and on the Bureau;

(b) the splitting of the Applied Chemistry Section would lead to an obvious increase in the cost of the Union; and

(c) it was felt that the only justifiable reason at the present time for splitting the Section would be if the duties of Section Officers were too onerous.

Recommendation

The Section Committee therefore concluded that there is insufficient justification at this time for a splitting of the Section, but it is strongly of the opinion that immediate steps should be taken to implement the recommendations set out in the document (appendix I) circularized immediately before the Montreal Conference.

This recommendation was accepted by the Council of the Union on Saturday, 5 August, 1961.

APPENDIX

Proposed new structure of the Applied Chemistry Section

Section Committee	*Membership*
President	Titular
Vice-President	Titular
Secretary	Titular
(Assistant Secretary—an ad hoc appointment for special Contingencies, i.e. International Congresses)	Titular
Chairman of Active Divisions	Titular
Representative (Chairman or Secretary) of Skeleton Divisions	Associate
Chairman of Commissions not attached to Divisions	Titular
Representatives of "International Associations"	Associate
A maximum of six elected members	Titular

Division Committee (Active)

(a) With no commissions	Maximum of 8 Titular members
(b) With one Commission	Maximum of 10 Titular members
(c) With two Commissions	Maximum of 12 Titular members
Divisions (Skeleton)	Maximum of 2 Associate members (Chairman and Secretary)
Commissions (unattached to Divisions) . .	Maximum of 8 Titular members

General Comments

The following notes include (for convenience) those accompanying the original scheme (Bulletin No. 11, page 32).

(1) *Assistant Secretary.* It is considered desirable to provide for the ad hoc appointment of an Assistant Secretary for particular contingencies, i.e. Congresses and Conferences. The growth of the Section may be found to require this appointment to be a permanent one.

(2) *Representatives (Chairman or Secretary) of Skeleton Divisions.* When an active Division has completed its immediate tasks it is desirable that it be disbanded but provision should be made for it to be re-formed when the occasion demands. If the Chairman, Secretary, or other representative remains as an Associate member of the Section Committee the re-forming of the Division would be facilitated.

(3) *Chairmen of Commissions not attached to Divisions.* There are no such Commissions in the Section at present but it is considered wise to provide for such a contingency.

(4) *Representatives of "International Associations".* Reference has already been made in the above mentioned Information Bulletin No. 11, pages 31 and 32, to these "International Associations", so there is no need to describe them here. A representative on the Section Committee would keep his Association informed of IUPAC activities and also would report to the Section Committee when the formation of a Commission or Division concerned with his particular industry would be opportune.

(5) *Members elected by the Section.* The Executive Committee at its 41st meeting held in March 1959 (Minute 27) resolved that in addition to the *ex officio* members of the Section Committee (Chairmen of Divisions) there should be up to six elected members. (See also Minute 64 of the 7th Section Committee meeting, Comptes Rendus of the 20th Conference 1959, p. 278.) The intention was to simplify the choice of President-elect and Secretary-elect. No advantage of this recommendation has been taken in view of financial stringency and of the impending reconsideration of the whole structure of the Applied Chemistry Section.

Another factor which has now become evident and which should be given consideration is the difficulty of maintaining reasonable geographical distribution of the members of the Section Committee when most are elected by the Division Committees. These extra elected members would be a useful means of ensuring a balanced representation.

(6) *Titular and Associate Membership.* The table showing the new structure of the Applied Chemistry Section indicates the number of Titular members. Such membership must of course depend upon the funds available and therefore the relative proportion of Titular and Associate members (who receive no subventions) would be liable to be varied from time to time.

Only *ex officio* Associate members are mentioned in the scheme, but the appointment of others for limited periods is envisaged and indeed has become the practice.

REPORT AND REQUESTS
to the Council and Bureau, Montreal 1961

(1) Recommendation that the suggested *composition of the Section* as outlined in Appendix page 178 be accepted and that immediate steps be taken to implement those recommendations. (Agreed by Council.)

(2) Only four of the Divisions of this Section have met in Montreal; the remainder were precluded from doing so for financial reasons. As a consequence this report cannot be complete.

(3) The *Food Additives Commission* whose report was presented to Council on 2 August needs financial assistance to complete the survey of information being obtained from member countries. It intends completing this task by the end of 1962. It requests: (a) that the Commission membership be increased from 4 to 6 by the inclusion of one member from Europe and possibly one from South America; (b) that the Commission be allowed to meet in 1962; (c) that financial assistance (750 pounds sterling) be provided.

(4) *The Water, Sewage and Industrial Wastes and the Fermentation Industries Divisions* desire to form a joint commission from their respective Division Committees to study the important subject of "The utilization and treatment of Organic Wastes by Biological Methods". This would not require the appointment of additional titular members; such a commission would meet when one or other of the two Division Committees were meeting.

(5) *The Plastics and High Polymer Division* requests the Union to sponsor a meeting on the subject of Plastics to be held in Paris in May 1962. No expense to the Union will be incurred and publication can be as directed by the Editorial Advisory Board of IUPAC.

(6) *The Paper, Pulp and Board Division* stresses the need for a Commission on *Paper Analysis* and requests permission to form such a Commission.

(7) *The Pesticides Division* proposes to submit certain nomenclature problems concerning pesticides to the Nomenclature Commission.

(8) *The Toxicology and Industrial Hygiene Division* has been invited to hold a joint meeting with "The Permanent International Committee on Occupational Health" in Paris or Zurich in 1962. It is requested that the Union sponsor the meeting which would involve the Union in no expenses. This meeting will be similar to that held in Prague a few years ago, the results of which are being reported in the Journal of IUPAC.

(9) *The Organic Coatings Division* received too late the invitation of the Union to meet in Montreal in 1961. It therefore continued with its very limited meeting already arranged for Copenhagen.

This Division has in hand: (i) the compilation of a report it is considered should be published as a book (running to possibly 30000 words) on "Hardness of Paint Films"; (ii) the compilation of a trilingual glossary (book) on terminology for the Paint Industry; (iii) the preparation of an addition to the book to be published by IUPAC on "Standard Methods of Analysis of Oils and Fats".

For the above publications financial assistance is needed and it is hoped that some of the 1961 budget for the Division may be utilized for that purpose, particularly as considerable economy resulted from its not meeting in Montreal.

A meeting of the Division in 1962 is desired.

(10) *The Oils and Fats Division*, which received no travelling subventions for a meeting in 1960 desire such subventions to be provided for a meeting in London in 1961 (October). (It is now understood that travelling subventions will be paid for 1960 and 1961 but not 1962.)

(11) All Divisions wish to meet in 1963 in London and four of the Divisions wish to hold Symposia either immediately before or after the Congress. The Divisions so concerned are the Pulp, Paper and Board, the Pesticides, the Organic Coatings and the Fermentation Division.

(12) The Fermentation Division (including its two commissions) was requested by the Bureau to postpone its meetings from 1961 to 1962 for financial reasons. It is presumed therefore that these meetings may be held in 1962.

10 August, 1961

Dr. J.H. Bushill, President

INDIVIDUAL REPORTS OF DIVISIONS

The following are mostly summarized reports which do not include matters concerning the membership of the Division Committees or Commissions. Such information will be found on page 60–70.

VI.1 Food Division

The Committee of this Division met twice during the period under review, attached to it, namely the Trace Elements in Food Commission and the Food Additives Commission. The former is nearing the end of its task, but the latter, which started as an ad-hoc Committee to report on the general subject of Food Additives, had its terms of reference widened when it became a Commission. This Commission now is charged with a study of analytical procedures for Food Additives.

The Trace Elements in Food Commission met in London on 24 September 1960 to discuss methods of determining lead and mercury. Prof. Dr. Reith has summarized the work of his Commission in the following terms:

"Some problems on the determination of micro-quantities of lead and mercury in food were discussed. A new draft on the determination of mercury based on this discussion has been distributed among the members together with samples for co-operative analysis. New drafts on the determination of lead which are taking into account the remarks given at the last meeting will soon be distributed as well. It is expected that at the next meeting of the Commission its work can be concluded."

The Food Additives Commission is collating information on analytical procedures for Food Additives from different countries. Prof. A.C. Frazer hopes to have most of the information by May 1961, after which the Commission will meet in Europe to decide how it can be presented in some usable form.

VI.2 Fermentation Industries Division

Since the Conference at Munich, 1959, considerable progress has been made by both Commissions of the Division.

Commission A met in Zurich in August 1960, which gave an opportunity for several people working in the field of fusel oil determination to meet each other for the first time. Each delegate described the fusel oils he had studied (according to the type of material fermented) and the technique employed.

There has been general agreement on the findings of various workers, and it appears that gas-phase chromatography will eventually be found, under

specified conditions, to afford the best means of quantitatively analysing fusel constituents in small volumes of fermented material.

The Commission had hoped to meet, and possibly complete, its work at a meeting in Helsinki in August 1961, but the withholding of a subsidy by IUPAC for this purpose may mean that the Commission will be unable to complete its work until 1962.

Commission B on dried yeasts also met in Zurich in August 1960 and expects to complete its task by the end of 1961. Some conflict of opinion has arisen over definitions, but it is hoped that this has been resolved. The Commission has carried out a number of comparative analyses and has arrived at agreed standards.

The Division is very anxious that future work should be in the direction of a study of the problem of utilisation of biological wastes, to be made in co-operation with the Water, Sewage and Industrial Wastes Division, which also favours the project. It is felt that the best means of achieving this is by the formation of a joint Commission of the two Divisions. It is hoped that a meeting of the two Divisions for this purpose will be possible in connection with the IUPAC London Conference and Congress in 1963.

VI.3 Oils and Fats Division

Since the Munich meeting in 1959, this Division has held one meeting, at Bari, Italy, on 11 and 12 October 1960.

The following are some of the items under active study: The Böhme Index; spectrophotometric determination of colour of oils (the previous established method is to be amended following the work of a French observer); a new method of estimation of free caustic alkali in soaps; solidification curve of fats (this to be studied in collaboration with the International Organization of Chocolate Makers); the ultraviolet spectrophotometric determination of poly-unsaturated fatty acids; carbonyl index (this is retained under the name "Benzidine Index" and will be standardized); the determination of monoglycerides (the method has been adopted and will be standardized).

Work on these topics is being carried out under the supervision of various members of the Division, some in collaboration with other bodies, such as the International Committee on Detergency (CID), the International Soap Works Association (AIS) and the International Organization for Standards (ISO).

On the subject of foots in linseed oil, a meeting of a Sub-Committee was held jointly with a Sub-Committee of the International Association of Seed-Crushers (Amsterdam, November 1959), at which a number of tests were agreed, and these form the basis of a report by Mr. W. V. Lee (Secretary of both Committees), dated 29 August 1960. Mr. Lee also attended a meeting of the Analysis Committee of the Organic Coatings Division in London, in September 1960, when analytical methods, etc., of common interest to the two Divisions were discussed, in particular in relation to drying oils. Further collaboration of the two Divisions is desired in the future.

On the estimation of water in oils, there is nothing new to report at present, but a new method is to be worked out in the light of observations of members of the Division.

Subjects which have been retained for later study include chromatographic determination of glycerides in crude oil, methods of sampling oils and fats, dilatometry and loss in refining.

"Standard Methods for the Analysis of Oils and Fats" is awaiting publication.

VI.4 Water, Sewage and Industrial Wastes Division

The Committee of this Division has at the moment two Commissions at the Munich Congress, September 1959, and during November 1960 in London. It is proposed to hold another meeting in Paris during the autumn of 1961.

A symposium of papers on subjects within the field of interest of the Division was held at Munich in 1959 on the occasion of the Conference of the International Union. The arrangements were made by the host country, Germany, in consultation with the Committee of the Division.

At the beginning of the period under review some progress had been made in the preparation of a report, intended for publication, to be entitled "Re-use of Water in Industry—a Contribution to the Solution of Effluent Problems". This is to contain papers on re-use of water in coal mining, the iron and steel industry, metal finishing, electroplating, the heavy chemical industry, and the manufacture of beet sugar. There is a general introduction by Mr. COLAS, of France, and a foreword by Prof. KRUL, of Holland. The General Editor is Mr. COLAS. Collating the various reports has entailed a considerable amount of work, but the project is now well advanced. Five of the chapters are in the proof stage, and one has been checked and returned to the publishers, Messrs. BUTTERWORTHS.

It is expected that the publication will be ready for sale during 1961.

The Committee has given some thought to the possibility of producing a second report for publication, to deal with other aspects of pollution problems, Nothing definite, however, has been decided on this and no concrete proposal can as yet be made.

It was decided not to ask for a meeting of the Division to be arranged in Montreal in 1961, but a proposal has been made for a Symposium to be held in London in 1963 on the occasion of the next Conference and Congress. If this were agreed, the Division would wish to explore the possibility of making a joint meeting with the Fermentation Division.

VI.5 Toxicology and Industrial Hygiene Division

Since the last report there has been no meeting of the Division. The work of the Division has proceeded by correspondence, the main preoccupation being preparations for the next meeting in 1961. It is proposed to devote most of this meeting to the control of industrial exposure to toxic substances by analytical measurements on biological material, chiefly urine or blood. The toxic substances which will be studied are mercury, lead, arsenic, carbon monoxide, benzene and trichloroethylene, and consideration will be given not only to the selection of the most suitable analytical methods, but also to the threshold concentrations which may be tolerated in exposed workers, and to the concentrations, if any, in the normal population not so exposed.

Analytical methods for the determination of the following seven substances have been submitted for publication: arsenic, benzidine, dichloroethane, ethylene oxide, ethylene chlorohydrin, *p*-naphthylamine and trinitrotoluene. This will bring the total number of published methods to 28.

VI.6 Pesticides Division

Investigational studies on pesticides are proceeding in a number of national, international and regional organizations, and consequently the Division has been careful to ensure that no study should be initiated which might duplicate investigations already in hand. To that end the Chairman

of the Division has made progress in collating terms of reference of the investigations at the above mentioned organizations.

The Division sees its primary task as a co-ordinating function, one of which is to organize Pesticides Congresses every few years.

The Meeting in Munich decided to explore urgently the possibility of holding the Vth International Congress on Crop Protection in Southern Rhodesia and, failing that, to investigate the possibility of holding it in Switzerland. At that time it was already clear that it would not be possible to find a sponsoring organization for a congress in USA.

The Chairman and the Secretary of the Pesticides Division tried to carry out the above decision of the Meeting. Unfortunately there will be no possibility of holding the next congress in Southern Rhodesia. The investigations in Switzerland are still pending. From various discussions with possible sponsors it became clear that the previous congress in Hamburg was looked upon as having had too wide interests and including too many items. The great number of visitors makes it difficult to find the necessary hotel accommodation, an organization to grant the expenses, or even to carry the risk that the visitors' fees will not pay for the expenses of the congress, the necessary personnel for running the correspondence before and the administrative work during the congress.

Till the end of 1961 the Pesticides Division consists of six titular members, including the Chairman and the Secretary. The period of service of three members will expire at the end of 1961.

VI.7 Plastics and High Polymers Division

National Representation. Following a proposal at the Dusseldorf Meeting, a letter was sent in December 1959 to all National Adhering Organizations of IUPAC inviting them to nominate National Representatives to participate in the work of the Division, and as a result nineteen countries are now represented—Australia, Austria, Belgium, Brazil, Canada, Czechoslovakia, France, Germany, Hungary, Israel, Italy, Japan, Netherlands, Spain, Sweden, Switzerland, United Kingdom, United States and USSR. Three countries reported that they did not wish to nominate representatives at this time, namely, U.A. Republic, India and Union of South Africa.

The following meetings have been arranged since the XXth Conference in Munich in 1959.

(a) A meeting of the Division was held at Dusseldorf on 18 October 1959, with sixteen members present, and an international symposium on the Ageing of Plastics, held the following day, attracted 1900 registrants from 24 countries. The seven papers presented were pre-printed in English, French and German by CARL HANSER, Verlag, and published in "Kunststoffe", *49*, No. 11, 1959.

(b) On 16 June 1960, thirteen members who were attending the symposium organized by the Macromolecular Commission in Moscow took this opportunity of arranging an interim discussion at the Hotel Ukraine on the programme and activities of the Division.

(c) A meeting of the Division was held in Turin on 27 September 1960, with eleven members present. On 28 September, a one-day symposium on Reinforced Polyester Resins was jointly sponsored by the Division and the XIIth International Congress on Plastics, when six lectures were given by speakers from five different countries. The complete proceedings of the Congress will be published by ETAS, Editrice, Milan, Italy. The papers will also appear in a special issue of "Poliplasti e Plastici Rinforzati", also published by ETAS, Editrice. The list of registrants for the Congress numbered approximately 300.

(d) In addition to the meetings of the Division at the XXIst Conference in Montreal, a two-day conference is being held as part of the XVIIIth Congress on the Relationships between Chemical Structures of Polymers and their Physical, Mechanical, Electrical and Rheological Properties.

(e) Arrangements are being made to co-sponsor a symposium in Paris in conjunction with the Groupe des Plastiques of the Société de Chimie industrielle, 21–26 Mai 1962, in conjunction with the Exposition Europlastique, 19–30 May 1962.

Programme of work. The following subjects were suggested at Dusseldorf as useful activities of the Division on an international scale:

(1) Collection of data on properties of plastics
(2) Guide for producers in providing data on new materials
(3) Compilation of Food and Drug Laws in relation to high polymers
(4) Review of toxicity problems
(5) Preparation of definitions pertaining to plastics materials and processes
(6) Exploration of fundamental basis of analytical procedures
(7) Compilation of basic engineering data needed in building industry (stress-strain, creep, and tearing characteristics)
(8) Compilation of weathering data needed, e.g. in the building and electrical industries
(9) Standardization of abbreviations for plastics
(10) Identification tests
(11) Classifications of plastics from chemical producer, and user points of view
(12) Corrosion problems, including attack and protection
(13) History of plastics
(14) Methods of determining and reporting molecular weight data on commercial plastics
(15) Recommendations on compilation of production statistics for plastics materials
(16) Review of customs classifications for plastics, including tests and specifications
(17) Standard colours for plastics
(18) Relationships of performance characteristics to basic parameters of the polymers and to accurately defined fabrication processes with emphasis on adequacy of (a) performance tests, (b) procedures for defining fabrication steps, and (c) standardized basic parameters including physical constants, molecular structure, and morphological characteristics

In order to decide the priority of this work, a questionnaire was circulated in February 1960, and action is in hand on Items 3, 7, 8, 9, 11 and 16. Item 18 is of considerable importance, and the possibility of work in this field is being actively considered.

With reference to Item 11, more than 1100 copies of the document entitled "Classifications of High Polymers: A Critical Review" have been distributed by the publishers Messrs. Butterworths. A task group has been set up to compile a supplement to this document, reviewing proposals that have appeared since the original report was prepared. The Chairman will also endeavour to synthesize a new proposal, based on points of agreement in the earlier schemes.

Under Item 9 the proposal for standardization of abbreviations is being revised on the basis of comments received subsequent to the Dusseldorf Meeting for re-submission to the members of the Division. They will also be sent to Working Group 1 ("Nomenclature and Definition") of ISO/TC 61.

Some documents are to be circulated with reference to Item 12, and to implement Items 3, 15 and 16, a letter is being prepared outlining the infor-

mation desired, and one member in each country will be requested to serve as a member of a task group to obtain the information needed from his country.

Liaison has been maintained with the Macromolecular Commission and with the International Standards Committee for Plastics (ISO/TC 61). The work of the Division has been reported to them and reports on their work have been made to the Division.

Arising out of the memorandum submitted to the IUPAC Bureau by the Executive Committee on the subject of proposed organizational changes in the Applied Chemistry Section, a resolution was unanimously adopted in Turin, that in view of (a) the magnitude of the plastics industry and the wide scope of its industrial activities, (b) the equally broad field and prolific research programmes represented by polymer science, and (c) the existing collaboration and co-ordination of the international activities of the Macromolecular Commission in the area of pure science and those of the Plastics and High Polymers Division in the area of applied chemistry, the fusion of these two groups is undesirable and impractical.

VI.8 Organic Coatings Division

The 1960 interim meeting of the Division was held in September in London at the time of the opening of the Jordan Laboratories of the Paint Research Station. Two half-day sessions were devoted to meetings of the Sub-Committee on Analytical Methods and four half-day sessions to meetings of the Sub-Committee on Testing Procedures.

Sub-Committee on Analytical Methods. A paper on Microchemical methods of analysis, which is being prepared by Mr. C. Whalley, and a report on "Analysis of Alkyd Resins" by Dr. J. Petit, with a supplementary paper on "Infrared analysis of alkyd resins" by Mr. H. K. Raaschou Nielsen, will be discussed at the 1961 meeting.

It is proposed to apply the methods of analysis of drying oils, as published by the Oils and Fats Division, to the requirements of the paint and varnish industry, and in addition to develop methods of determining the following: polybromide value, hydroxyl value (especially for alkyd resins), content of oxidized oils, mono-, di- and trimeric acids and of resin.

Sub-Committee on Testing Procedures. The present main object of this Sub-Committee is the preparation of a critical literature survey on hardness testing of paint and varnish films. At the London Meeting, Mr. P. H. Fink-Jensen dealt with the *theoretical introduction*, while Dr. D. Wapler presented a short supplementary paper on *technological methods*, and Dr. Oesterle gave a general paper on hardness testing, in which he stressed the importance of testing hardness at infinitesimal identations. Dr. J. A. W. van Laar then discussed the correlation between the many practical hand tests, which are being used daily in laboratory control work, and the fundamental properties of the films.

Following the discussions of the individual contributions at the London Meeting, the authors have revised their papers. After a final discussion at the 1961 meeting, the Sub-Committee plans to prepare a critical literature survey for publication as soon as possible.

Sub-Committee on Terminology. While there was no ordinary meeting of the Sub-Committee on terminology during the London Meeting, the problem of translating matters concerning the surface coatings industry was discussed in connection with a memorandum on the subject, which had been prepared by Dr. L. A. Jordan. The consensus of opinion of the members was that the envisaged booklet would satisfy a long felt want; Dr. L. A. Jordan was asked to continue the work on the English version.

Membership. It was decided to invite the director of the Belgian Paint and Varnish Research Institute, Mr. A. CAILLIEZ, to become titular member of the Division, and the director of the Swedish Paint and Varnish Research Institute, Dr. M. I. HUSS, to become delegate member of the Division.

Next Meeting. Most of the work of the Organic Coatings Division is carried out in the Sub-Committees, whose members all live in Europe, and it had therefore been decided that the Division should not meet in Montreal during the 1961 Conference of the IUPAC. Since the Division had not previously had any meetings in Scandinavia, it was decided that its 1961 meeting should be held in Copenhagen in the early part of the summer. The exact dates have since been fixed for 26–28 June.

VI.9 Pulp, Paper and Board Division

The Division Committee has not met since the Congress at Munich in 1959, but has carried on its work by correspondence amongst its members.

Scientific work has progressed steadily through the Commission entitled "International Committee for Cellulose Analysis". Methods have been systematically evaluated in various co-operating laboratories, and adopted when extensive investigation has brought unanimous agreement as to validity.

A major effort has been the organization of a Symposium on Wood Chemistry to be held in conjunction with the IUPAC 1961 Conference in Montreal. Contributions have been by invitation only, and an outstanding programme has been arranged, which is attracting world-wide attention, and which will add significantly to our knowledge of the chemistry of wood, as well as making possible an exchange of ideas in this field by authorities of the highest standing from various countries of the world.

The chief general contribution which can be made by this Division lies in the field of exchange of knowledge on the broadest possible international scale. In this connection it is noted again (and this has been emphasized before) that this Division is seriously handicapped by the limit of Titular Membership to the total of eight. The researches now being carried out in the USSR and Czechoslovakia, for example, are of such a calibre as to make the Division incomplete without inclusion of representatives of those countries on the Committee. The need for an increase in Titular Membership from eight to ten is again emphasized.

Some further action has been taken towards the standardization of publication practices in journals of major interest in the field of Pulp, Paper and Board.

A preliminary survey made on the advisability of setting up a directory of current research projects in research and educational institutes all over the world showed that the costs involved would be great and the project was shelved for the time being. It is felt, however, that this concept has great potential value and should not be abandoned entirely.

COMPTES RENDUS
DE LA VINGT ET UNIÈME CONFÉRENCE

XXI

MONTRÉAL

2–5 août 1961

INTRODUCTION

Pendant quelques années, il était de coutume que l'Union internationale de Chimie pure et appliquée tienne sa réunion administrative bisannuelle, la Conférence, conjointement à un congrès scientifique organisé par le pays dans lequel cette réunion a lieu. En 1961, la XXI[e] Conférence internationale de Chimie pure et appliquée s'est déroulée à Montéral sur l'invitation du Conseil national des Recherches du Canada, et fut suivie du 18[e] Congrès international.

Il est peut-être significatif que cette réunion se soit tenue – pour la deuxième fois hors d'Europe – exactement dix ans après la XVI[e] Conférence qui eut lieu à Washington et à New York conjointement au plus grand congrès de chimie qui ait jamais été organisé, à l'occasion du 75[e] Jubilé de la Société américaine de Chimie. Ce congrès, qui remporta un succès retentissant, était organisé par nos collègues américains, sous la présidence du Prof. W.A. NOYES, jr., qui est actuellement Président de l'Union internationale de Chimie pure et appliquée. 17000 chimistes s'annoncèrent pour les célébrations du jubilé et plus de 7000 participèrent au Congrès de l'Union internationale de Chimie pure et appliquée de New York.

Le rassemblement d'un nombre aussi élevé de chimistes eut une influence déterminante sur la politique d'organisation des futurs congrès. Il était toujours à redouter que les chambres d'hôtels ne soient assez nombreuses, les salles de conférences trop exiguës pour recevoir autant de monde. C'est pourquoi une décision a été prise à Washington de limiter le nombre des participants aux prochains congrès de l'Union internationale de Chimie pure et appliquée et, dans ce but, de restreindre les sujets de conférences.

Ainsi qu'il en avait été décidé à Leningrad, les conférences au Congrès de Montréal se rattachaient principalement aux thèmes suivants: chimie physique, macromolécules, hautes températures, microtechniques, pesticides et chimie du bois. Le Comité d'organisation à Ottawa et à Montréal, présidé par le Dr E.W.R. STEACIE et le Prof. L. MARION, était prêt à recevoir plusieurs milliers de visiteurs. Le nombre total des participants s'est élevé à 2739. Il est facile de comprendre que nos collègues canadiens auraient préféré voir leurs efforts récompensés par une participation plus importante.

La XXI[e] Conférence, qui eut lieu dans les bâtiments de l'Université de Montréal, obtint une grande participation grâce aux efforts des organismes adhérents et du Trésorier de l'IUPAC. Ce fait prouve que les chiffres de participation ne peuvent servir de critère pour juger de la valeur scientifique d'un congrès. Les frais de voyage et de séjour ainsi que le climat ont une très grande influence. Ce sont des facteurs dont les organisateurs de futurs congrès devraient tenir compte. Nous les rapportons ici à cet effet.

Un autre point devrait être pris en considération. On a signalé fréquemment que le temps des congrès monstres était révolu et que de petits symposia avaient plus de valeur. Il est probablement juste de prétendre que le progrès scientifique est mieux servi par de tels colloques répartis dans le monde entier. D'un autre côté, nous n'avons pas l'impression que l'Union internationale de Chimie pure et appliquée puisse se permettre d'ignorer les intérêts du grand nombre de chimistes qui travaillent dans les universités, les laboratoires de recherches et dans l'industrie chimique. La participation à un grand congrès peut être une expérience des plus encourageantes pour le chimiste. Nous pensons que c'est une des tâches de l'Union internationale de Chimie pure et appliquée d'offrir la possibilité à chaque chimiste de se rendre au moins une fois dans sa vie à un de ces congrès. Dans cet ordre d'idées, des congrès à l'intention des chimistes devraient être organisés, disons, au moins tous les vingt ans.

Si nous divisons le monde arbitrairement en dix secteurs, en observant l'ordre de rotation, une fois tous les vingt ans, presque chaque chimiste aura la perspective encourageante de participer à un grand congrès. Il est évident que, si le but est d'atteindre autant de chimistes que possible, un congrès doit toucher tous les domaines et, afin d'avoir une valeur scientifique, de hautes personnalités devraient être chargées des conférences magistrales.

L'organisation de congrès et symposia est presque toujours influencées et en fait décidée par les «sommités de la science» qui sont sollicitées par de trop nombreux congrès. Cet état de choses ne devrait cependant pas contrecarrer les intérêts des autres chimistes qui se comptent par milliers et ne peuvent être ignorés.

Du point de vue scientifique, le XVIIIe Congrès fut un succès tout particulier, dû en grande partie aux magnifiques efforts de nos amis canadiens qui ont invité un très grand nombre de conférenciers dont nous vous donnons la liste ci-après:

Conférences plénières

Prof. F.S. Dainton, Leeds (GB): «Nouveaux horizons en chimie physique»

Prof. R. Daudel, Paris (France): «Quelques récents résultats concernant les relations entre la structure et la réactivité chimique des molécules organiques»

Académicien N.N. Semenov, Moscou (URSS): «Certaines réactions chimiques à températures réduites et problèmes connexes de transfert d'énergie»

Prof. G. Schwarzenbach, Zurich (Suisse): «Molécules et ions inorganiques métastables produits par addition et élimination de protons»

Prof. R.H. Wilhelm, Princeton (USA): «Progrès vers la conception a priori des réacteurs chimiques»

Conférences de sections

A. Chimie physique

Sec. A.1 *Structure et réactivité des petites espèces moléculaires*

Prof. P. Goldfinger, Bruxelles (Belgique): «Réactions des atomes d'halogènes»

Dr A.S. Gordon, China Lake, Californie (USA): «Quelques réactions des radicaux cyclo-alcoyles»

Dr G. Herzberg, Ottawa (Canada): «Spectres et structures des radicaux libres»

Prof. H.C. Longuet-Higgins, Cambridge (GB): «La chimie théorique des molécules excitées»

Prof. R.S. Mulliken, Chicago (USA): «Quelques progrès récents concernant la structure électronique des molécules»

Prof. O. Osberghaus, Fribourg (Allemagne): «Etudes par spectrométrie de masse des produits unimoléculaires de désintégration des hydrocarbures neutres et ionisés»

Dr V.L. Tal'Rose, Moscou (URSS): «Réactions des ions et des molécules en phase gazeuse»

Sec. A.2 *État solide*

Dr D.W.J. Cruickshank, Leeds (GB): «Le rôle des orbitales 3d dans les liaisons-π entre Si, P, S ou Cl et O ou N»
Dr D.L. Dexter, Rochester, N.Y. (USA): «Processus d'excitation dans les cristaux»
Prof. M. Magat, Paris (France): «Réactions de radicaux organiques à l'état solide, entre 90° et 273 °K»
Dr S.A. Rice, Chicago (USA): «Mouvements moléculaires dans les solides»
Prof. F.C. Tompkins, Londres (GB): «Imperfections et réactivités chimiques»

Sec. A.3 *Propriétés chimiques et thermodynamiques aux températures élevées*
États condensés

Prof. J.L. Margrave, Madison (USA): «Production et mesure des hautes températures»
Prof. H. Nowotny, Vienne (Autriche): «Structure cristalline et stabilité des phases réfractaires»
Prof. F. Trombe, Paris (France): «Chauffage et opérations à hautes températures sans contamination»
États gazeux
Dr I. Fells, Sheffield (GB): «Processus d'ionisation dans les gaz et leur application aux systèmes de conversion de l'énergie»
M. Bela Karlovitz, Pittsburgh (USA): «Flammes augmentées par l'énergie électrique»
Prof. N. Manson, Université de Poitiers (France): «Possibilité de vérification des propriétés thermodynamiques au moyen des caractéristiques de détonation»
Propriétés thermodynamiques
Prof. Haakon Flood, Trondheim (Norvège): «Thermodynamique et structure des sels fondus»
Prof. P.W. Gilles, Lawrence, Kansas (USA): «Espèces ternaires aux hautes températures»
Dr D.R. Lovejoy, Ottawa (Canada): «L'échelle des températures au-dessus de 1000 °C»

Sec. A.4 *Chimie nucléaire*

Dr J.M. Alexander, Berkeley, Cal. (USA): «Réactions nucléaires des ions lourds»
Dr G. Friedlander, New York (USA): «Revue des réactions nucléaires à haute énergie»
Prof. J.M. Miller, New York (USA): «Réactions nucléaires d'énergie moyenne»

B. Chimie appliquée

Sec. B.1 *Structure et activité catalytique des surfaces de métaux*

Prof. R. Gomer, Chicago (USA): «Applications des émissions de champ aux problèmes d'adsorption»
Prof. Dr J. Horiuti, Sapporo (Japon): «Homogénéité et hétérogénéité de la surface des catalyseurs métalliques»
Dr D.W. Pashley, Cambridge (GB): «Études d'optique électronique sur la relation existant entre la structure des surfaces de métaux et leurs pellicules de ternissure»
Prof. G.-M. Schwab, Munich (Allemagne): «Activité catalytique des métaux»

Sec. B.2 *Processus métallurgiques*

Prof. JOHN CHIPMAN, Cambridge (USA): «Réactions des métaux de laitier dans les processus métallurgiques»

Dr W. MARTIN FASSELL, Jr., Newport Beach, Cal. (USA): «Métallurgie extractive aux pressions hyper-atmosphériques – son passé, son présent et son avenir»

Prof. A.E. VAN ARKEL, Leiden (Pays-Bas): «Aspects généraux de la production des métaux non usuels»

Sec. B.3 *Electrochimie*

Prof. J. O'M. BOCKRIS, Philadelphie (USA): «La structure des sels en fusion»

Prof. P. DELAHAY, Baton Rouge (USA): «Quelques récents progrès dans l'étude des processus d'électrodes»

Prof. R. PIONTELLI, Milan (Italie): L'électrochimie des monocristaux»

Sec. B.4 *Matières plastiques et hauts polymères*

Dr R.F. BOYER, Michigan (USA): «Relation entre les températures de transition des polymères et la structure chimique»

Prof. S.G. MASON, Montréal (Canada): «Quelques phénomènes rhéologiques dans les émulsions et les suspensions»

Dr W. REDDISH, Welwyn Gardens City (GB): «Structure chimique et propriétés électriques des hauts polymères»

Prof. H.A. STUART, Mayence (Allemagne): «Phénomènes de cristallisation des hauts polymères»

Sec. B.5 *Colloque sur la chimie du bois*

Prof. T. ENKVIST, Helsingfors (Finlande): «Nouvelles conceptions sur les réactions de la lignine dans la production des pulpes Kraft»

Prof. K. FREUDENBERG, Heidelberg (Allemagne): «Biogenèse et constitution de la lignine»

Dr D.A.I. GORING, Montréal (Canada): «La chimie physique des lignines»

Dr J.K. HAMILTON, Shelton, Washington (USA): «Le comportement des hydrates de carbone du bois dans les processus techniques de réduction en pulpe»

Prof. J.J. HERMANS, Syracuse (USA): «Mécanismes chimiques dans la greffe de la cellulose»

Prof. E.L. HIRST, Edimbourg (Ecosse): «La structure chimique des hémicelluloses»

Prof. J.K.N. JONES, Kingston (Canada): «Biogenèse des hydrates de carbone dans le bois»

Prof. BENGT LINDBERG, Stockholm (Suède): «Nouvelles méthodes d'isolation des hémicelluloses»

Dr J. MANN, Manchester (GB): «Techniques modernes pour évaluer la cristallinité de la cellulose»

Dr R.H. MARCHESSAULT, Marcus Hook, Pa. (USA): «Applications de la spectroscopie infrarouge à l'étude de la cellulose et des polysaccharides du bois»

Dr HANS MEIER, Stockholm (Suède): «Aspects chimiques et morphologiques des structures fines du bois»

Prof. A.H. NISSAN, Troy (USA): «La cellulose en tant que polymère visco-élastique»

Prof. Kyosti Sarkanen, Syracuse (USA): «La chimie de la délignification dans le blanchiment de la pulpe»
Prof. Lennart G. Stockman, Stockholm (Suède): «Progrès récents et tendances actuelles dans la production de la pulpe au sulfite»
Dr Kyle Ward, jr., Appleton, Wis. (USA): «Extraction fractionnée des hémicelluloses et leurs propriétés»

C. Chimie analytique

Sec. C.1 *Analyse des métaux et des minéraux*

Dr V.A. Fassel, Ames, Iowa (USA): «La détermination des oligo-élements dans les métaux et dans les minéraux»
Dr G.W.C. Milner, Harwell (GB): «Méthodes électrochimiques pour l'analyse des métaux et des minéraux»
Dr H.A. Sloman, Teddington (GB): «La détermination des gaz dans les métaux»

Sec. C.2 *Chimie analytique des métaux non usuels*

Prof. M. Bobtelsky, Jérusalem: «La contribution de l'hétérométrie à la chimie analytique des métaux non usuels»
Dr K.L. Cheng, Princeton (USA): «Détermination du zirconium et de l'hafnium au moyen de certaines phtaléines»
Prof. A.K. Majumdar, Calcutta (Inde): «Considérations sur la séparation du niobium et du tantalum»
Dr Rudolf Pribil, Prague (Tchécoslovaquie): «Les nouvelles réactions analytiques de l'indium et du gallium»

Sec. C.3 *Analyse des résidus de pesticides*

Dr S. Dormal, Gembloux (Belgique): «Méthodes comparatives de l'analyse des résidus»
Dr R.D. O'Brien, Cornell (USA): «Configuration moléculaire et activité des pesticides en rapport avec la dégradation et le métabolisme»
Dr W.E. Westlake, Beltsville, Md. (USA): «Buts et progrès aux États-Unis des travaux régionaux concernant les résidus de pesticides»
M. F.P.W. Winteringham, Slough (GB): «Techniques des traceurs radio-actifs pour l'étude du cheminement chimique des insecticides»

D. Colloque de chimie organique

Sujet *Stéréochimie dynamique* (communications sur invitation seulement)

Prof. S.J. Angyal, New South Wales (Australie): «Analyse conformationnelle quantitative dans la chimie des hydrates de carbone»
Prof. D.H.R. Barton, Londres (GB): «Nouvelles réactions photochimiques et leur spécificité stéréochimique»
Prof. E.J. Corey, Cambridge (USA): «Récents progrès en stéréochimie des structures organiques»
Prof. O. Jeger, Zurich (Suisse): «Aspects stéréochimiques de quelques nouvelles réactions de substitution et de réarrangement»

Prof. R.U. LEMIEUX, Ottawa (Canada): «Énergies d'interactions sans liaison dans les structures des hydrates de carbone»
Prof. G. OURISSON, Strasbourg (France): «Quelques aspects nouveaux de l'analyse conformationnelle»
Prof. G. STORK, New York (USA): «Contrôle stéréochimique dans les synthèses totales»
Prof. S. WINSTEIN, Los Angeles, Calif. (USA): «Aspects stéréochimiques des effets d'homoconjugaison et des effets anchimériques»

Le programme récréatif, très intéressant et très varié, comprenait une «café-party» à l'Hôtel Queen Elizabeth, un concert en plein air au Mount Royal, un banquet, un spectacle de danses folkloriques donné par «Les Feux Follets» et un spectacle hippique présenté par la célèbre police montée du Canada.

Le programme réservé aux dames fut extrêmement bien organisé et prévoyait un grand nombre d'excursions en autocars et en bateaux ainsi qu'un défilé de mode.

Il est toujours difficile – surtout pour un étranger – de citer les quelques personnes à qui revient le succès de telles manifestations. Il faut pourtant nommer le Dr E.W.R. STEACIE, président du Congrès, et le Prof. L. MARION, président du Comité d'Organisation. On a vivement déploré que le Dr E.W.R. STEACIE ait été empêché, pour des raisons de santé, de participer au Congrès, mais c'est un plaisir de pouvoir signaler qu'il était tout à fait rétabli lorsqu'il accepta récemment à Londres la lourde charge de Président du Conseil international des Unions scientifiques (ICSU). Nous lui adressons toutes nos félicitations pour sa nomination et formons le vœu que, la santé recouvrée, il pourra, grâce à sa grande habileté et à son expérience, résoudre au moins quelques problèmes de cette Organisation.

Le Comité d'Organisation, qui comptait trois vice-présidents, les Drs H. HOERIG, ROBINSON ORD et I.E. PUDDINGTON, en plus du Dr E.W.R. STEACIE et du Prof. L. MARION, conscient de la nécessité d'un secrétariat efficient, désigna un secrétaire du Congrès permanent en la personne de M. D. HUNKA. Ce dernier fut parfaitement secondé par Mrs. R. THOMPSON du Centre national de la Recherche à Ottawa. Les présidents des différents comités doivent également être mentionnés:

Présidents des Comités

Programme	Dr W.G. SCHNEIDER
Finances	M H. GREVILLE SMITH
Budget	Dr P.R. GENDRON
Hôtels	M. C.R. BURROWS
Inscription	M. G.K. WRIGHT
Activités récréatives	M. A. MONSAROFF
Visites et excursions	Dr J.C. CLUNIE
Publicité	M. P.A. NOVIKOFF
Transports	Dr R. RIVEST
Programme des dames	Mme J.H. SHIPLEY

Le programme réservé aux dames fut particulièrement bien préparé, comme c'est souvent le cas pour nos Congrès et nous le devons particulièrement à Mme SHIPLEY et à son comité. Il ne sera pas étonnant qu'à l'avenir un plus grand nombre de chimistes s'inscrivent pour le programme des dames.

Les personnes peu accoutumées au genre de vie américain auront été peut-être un peu surprises de trouver un comité de publicité dont le président était M. P.A. NOVIKOFF qui ne manqua pas d'assaillir les conférenciers.

Il est peut-être intéressant de relever à l'intention des organisateurs de congrès futurs que les possibilités d'excursions offertes par les agences de voyages, après le Congrès, ne semblent pas particulièrement attirer les chimistes. Les expériences faites dans ce domaine par nos collègues canadiens ne diffèrent guère de celles acquises au cours des congrès précédents.

XXI[e] CONFÉRENCE

La XXI[e] Conférence de l'Union internationale de Chimie pure et appliquée a eu lieu dans les bâtiments de l'Université de Montréal, magnifiquement située sur la colline dominant la ville. Le Prof. W.A. NOYES, jr, assura la présidence. La liste des participants se trouve à la page 22.

Le Prof. NOYES ne procéda pas à la lecture de son «Rapport sur l'Etat général de l'Union» qui avait déjà été distribué en anglais et en français à tous les membres du Bureau et aux Organismes adhérents. Chaque participant en reçut également un exemplaire au début de la Conférence. Dans ses paroles d'ouverture, le Prof. NOYES tira une comparaison, en tant qu'Américain, entre son propre rapport et le discours inaugural que le Président des Etats-Unis doit tenir devant le Congrès et le Sénat sur la situation générale de son pays.

On porta un grand intérêt aux réunions du Conseil, comme à celles des Sections, Divisions et Commissions. Ceci vient renforcer l'opinion selon laquelle on devrait prévoir à l'avenir plus de temps pour les discussions et que l'on devrait recourir à l'occasion de ces sessions à tous les moyens techniques modernes de communication, comprenant en outre la traduction simultanée. Le Prof. NOYES déclara que «beaucoup plus de temps devrait être consacré aux réunions du Conseil. Plusieurs délégations envoyèrent des représentants à Montréal pour ne prendre part qu'à deux sessions de trois heures chacune. Nous devrions faire du Conseil une organisation législative beaucoup plus importante qu'elle ne l'a été jusqu'à maintenant. L'ordre du jour prévu pour la réunion du Conseil devrait différer de l'ordre du jour des réunions du Bureau et du Comité exécutif. En réalité, correspondant à la rubrique «Divers», une liste ronéotypée des questions à traiter devrait être dressée la veille de la réunion du Conseil et après la dernière réunion du Bureau précédant la séance du Conseil. S'il est impossible d'obtenir une traduction simultanée, des traducteurs exercés pour le Russe, le Français et l'Anglais devraient être à disposition».

Il a été convenu que l'Union internationale de Chimie pure et appliquée devrait pouvoir disposer de moyens plus grands pour répondre aux besoins de la science qui se développe toujours plus rapidement. Dans ce but, comme il est relevé dans le procès verbal (p. 218), un Comité ad hoc des Finances (Président: Prof. J. BAILAR) a été formé ainsi qu'un Comité spécial qui, sous la présidence du Prof. P.E. VERKADE, est chargé d'étudier une structure appropriée de l'Union internationale de Chimie pure et appliquée.

La deuxième réunion du Conseil, le samedi, fut suivie d'un excellent banquet gracieusement offert par le Comité d'Organisation.

L'Union internationale de Chimie pure et appliquée était prête à sacrifier la plupart de ses réserves afin d'assurer le succès de la Conférence et du Congrès de Montréal. Toutefois, grâce à la générosité de nombreux pays membres qui ont payé une souscription annuelle plus forte, versé des contri-

butions volontaires ou accepté d'assumer les frais de transport de leurs membres titulaires, le déficit créé par cette manifestation put être ramené à des proportions acceptables. Il faut aussi relever que l'affrètement d'un avion spécial de Paris à Montréal permit également de réaliser une économie supplémentaire. Après un travail considérable, dont nous sommes particulièrement reconnaissants à M. J. GIVAUDON, Directeur de l'Union des Industries chimiques, Paris, et à M. J.F. ULMER, des Wagons-Lits Cook Paris, un avion d'Air France a été presque rempli.

RAPPORT DU PRÉSIDENT SUR L'ÉTAT GÉNÉRAL DE L'UNION

pour l'exercice 1959–1961, selon l'article 8 des Statuts
(traduction faite par Mme W.A. NOYES)

Les membres chargés de la direction d'une organisation (Officers of an organization) ont une responsabilité envers tous les autres membres de cette organisation et doivent leur adresser des rapports à des intervalles réguliers. Le Président de l'Union internationale de Chimie pure et appliquée doit présenter son rapport à chaque Assemblée générale de l'Union, c'est-à-dire, au moins tous les deux ans.

Au début de la lecture de ce rapport, il serait bon de se remémorer qui sont les membres de cette Union. Les grandes sociétés scientifiques mondiales sont, en général, composées d'individus bien qu'il y ait aussi des provisions permettant d'accepter, comme membres, des sociétés industrielles. Ceci est surtout à dessein d'augmenter les revenus, car les privilèges dont jouissent ces membres consistent surtout en des cotisations élevées, quelques abonnements à des périodiques et ne donnent pas le droit de voter.

Ce sont les individus qui sont les véritables membres de l'Union, parce qu'ils font partie de l'administration, des comités, des commissions et des divisions. Ils déterminent la ligne de conduite de l'Union et les buts qu'elle désire poursuivre. Au sens légal, toutefois, ce sont les nations et non les personnes qui sont les membres de l'Union. Les Statuts reconnaissent que, chimiquement parlant, certaines nations sont plus importantes que d'autres et qu'elles peuvent et doivent verser des cotisations annuelles plus élevées pour le maintien de l'Union.

Il y a une différence pratique entre le système de l'Union et celui des Nations Unies et ses agences spécialisées. Dans les Nations Unies, la responsabilité financière est calculée suivant une formule compliquée qui oblige les nations les plus riches à contribuer le plus. En dépit de la nécessité évidente d'obtenir plus d'argent des nations riches, chaque nation, petite ou grande, n'a qu'un seul vote au cours d'une Assemblée générale ou d'une Conférence. Ce n'est qu'au Conseil de Sécurité et aux «Governing Boards» que les grandes nations ont plus d'influence que les petites. Néanmoins, l'opinion des petites nations influence souvent des décisions très importantes.

L'Union internationale de Chimie pure et appliquée est basée sur un compromis: le barème des paiements en vigueur depuis le 1er janvier 1961 varie de 450 dollars à 10000 dollars par an, proportion de 1 à 22, tandis que les votes au Conseil ne varient que de 2 à 6. Même si les administrateurs de l'Union expriment, à part soi, leur mécontentement et désapprobation quand une nation désire être classée dans une catégorie basse et payer moins qu'elle ne le devrait, ce sont les nations qui elles-mêmes déterminent leurs catégories et leurs cotisations.

Le temps passe et la science progresse. Non seulement la quantité de recherches (mesurée par le nombre d'articles publiés) augmente énormément, mais encore les capitaux placés dans l'industrie chimique, le nombre des chimistes, la diversité de leurs intérêts croissent avec une telle rapidité qu'il est difficile de prédire l'avenir. D'une seule chose nous pouvons être sûrs: leur croissance ne risque pas de s'arrêter ou même de diminuer. La santé publique, les standards de vie, la conquête de l'espace, l'archéologie, l'énergie atomique, etc., tous dépendent de la chimie. L'avenir trouvera des chimistes partout et l'Union doit s'adapter à la diversité toujours

croissante des sujets traités et à une nouvelle distribution géographique des chimistes.

Nous n'avons pas de chiffres très exacts sur le nombre de chimistes actuellement en Asie, au Moyen-Orient, en Afrique et dans l'Amérique latine; même en ce qui concerne certains pays d'Europe nos renseignements laissent beaucoup à désirer. Personnellement, je peux exprimer ma surprise et ma satisfaction en prenant connaissance des chiffres que nous apporte quelque nouveau pays demandant à se joindre à l'Union, et je trouve que nous devrions faire plus pour cultiver l'amitié et la loyauté des chimistes du monde entier.

La distribution géographique actuelle des membres de l'Union, les votes au Conseil, la composition du Bureau et du Comité exécutif sont donnés dans les tables suivantes:

Table I – Composition du Conseil de l'Union internationale de Chimie pure et appliquée

Region géographique	Nombre de Contrées	Fraction	Votes au Conseil	Fraction
Europe occidentale . . .	16	0,44	68	0,50
Europe orientale	7	0,19	22	0,16
Amérique du Nord . . .	2	0,06	12	0,09
Asie	3	0,08	12	0,09
Moyen-Orient	3	0,08	6	0,04
Amérique latine	3	0,08	8	0,06
Australie	1	0,03	4	0,03
Afrique	1	0,03	4	0,02
Totaux	36	0,99	136	1,00

Le rôle dominant joué par les pays de l'Europe occidentale est bien démontré dans la table I. En somme, quand l'Union fut fondée en 1919, elle était surtout une association de chimistes de l'Europe occidentale avec quelques membres çà et là dans le reste du monde. Dans l'intervalle entre les deux grandes guerres une conférence eut lieu en Amérique du Nord (Washington) en 1926 et deux en Europe orientale (Bucarest 1925, Varsovie 1927). Toutes les autres prirent place en Europe occidentale. Durant cette même période, toutes les réunions des Congrès eurent lieu en Europe. La plupart des jeunes chimistes qui n'habitaient pas l'Europe ne connaissaient pas – ou très peu – l'Union et ne s'y intéressaient pas. C'est à peine s'ils savaient que les rapports sur les poids atomiques, la nomenclature et autres sujets du même genre venaient de l'Union. C'étaient toujours les mêmes visages qu'on voyait à toutes les réunions.

Si l'Union de 1919 à 1939 a accompli certaines fonctions nécessaires et si, comme quelqu'un l'a dit, une Union de Chimie aurait certainement été créée si celle-ci n'avait pas existé, il faut du moins reconnaître en toute sincérité que la grande majorité des chimistes du monde entier savait à peine qu'elle existait. Ceux qui le savaient, avaient souvent l'impression que l'Union était dominée par une petite clique provenant des quelques mêmes pays.

A la fin de la Première Guerre mondiale, il y eut une période d'internationalisme idéaliste; on vit la formation de la Société des Nations, le Conseil international des Unions scientifiques, plusieurs unions internationales et une quantité d'autres sociétés internationales. Elle fut suivie par une période de réalisme. La Société des Nations, trop faible, mourut;

le Conseil international des Unions scientifiques ne survécut que grâce au grand dévouement de son Secrétaire général; quelques-unes des unions scientifiques moururent et d'autres devinrent des sociétés de peu d'influence.

La fin de la Seconde Guerre mondiale vit la formation des Nations Unies et de ses agences spécialisées, y compris Unesco; une nouvelle vigueur anima le Conseil international des Unions scientifiques et plusieurs autres unions scientifiques et de nouvelles unions se formèrent. Si des unions étaient nécessaires avant la Seconde Guerre mondiale, elles le sont encore bien davantage aujourd'hui. Les problèmes de symboles, de nomenclature et de constantes sont d'une importance croissante si nous ne voulons pas dégénérer en une sorte de tour de Babel et que les chimistes d'une partie du monde ne puissent pas comprendre le travail de ceux d'une autre partie.

Les nations dépendent de plus en plus les unes des autres pour les matières premières. L'exploration de l'espace, la puissance nucléaire et la santé publique exigent une coopération internationale sur une échelle toujours croissante. Une poussée de nationalisme scientifique ne saurait être tolérée.

L'Union est-elle organisée pour faire face à l'avenir ? Les chimistes du monde entier connaissent-ils les fonctions de cette Union ? Sont-ils représentés d'une façon efficace par l'Union ? Beaucoup de progrès ont été accomplis, mais il reste encore beaucoup à faire.

La distribution des votes au Conseil, comme le montre la table I n'a pas grand rapport au nombre de chimistes dans un certain pays ou à l'importance de l'industrie chimique. Elle a encore moins de rapport à la situation géographique ou à l'importance que les différentes parties du monde auront dans l'avenir.

On éprouve quelque difficulté à définir «un chimiste». Pour décider si les chimistes sont représentés d'une façon raisonnable et équitable devrait-on compter seulement les chimistes faisant des recherches ou tous les chimistes ? Quelle que soit la méthode employée le nombre des chimistes semble être plus élevé dans les pays de l'Amérique du Nord que dans ceux de l'Europe occidentale. Si on se base sur la population totale, tous les pays sont sous-représentés en comparaison de ceux de l'Europe occidentale.

La situation n'est pas grave pourvu que les différentes parties du monde aient l'impression qu'elles ont voix au chapitre. Ce n'est pas certain. C'est le Bureau qui formule le rôle et les buts de l'Union. Il est composé de 22 membres dont 8 sont ex officio; 6 sont présidents de sections et sont choisis par ces sections; 2 sont des anciens présidents. Il y a donc 14 personnes qui doivent être élues par le Conseil. De ces 14 personnes, l'une est le Secrétaire général et l'autre le Trésorier honoraire. Pour ces deux postes, il est indispensable de choisir des personnes compétentes et qui disposent de beaucoup de temps à consacrer aux affaires de l'Union. On doit bien se garder de les choisir pour raisons «politiques» bien qu'elles exercent souvent une influence décisive sur la politique intérieure de l'Union.

A présent, c'est surtout en Europe occidentale que l'Union est active, c'est donc là que le Secrétaire général et le Trésorier honoraire doivent résider. Un jour viendra où ce sera différent.

Les six présidents de section doivent être choisis pour leur valeur dans le domaine de la chimie qu'ils représentent. A l'heure actuelle, ils résident tous en Europe occidentale; les deux anciens présidents habitent aussi en Europe occidentale. Ainsi, en ce moment, les huit membres ex officio sont de l'Europe occidentale.

Table II – Distribution géographique du Bureau

Région géographique	Nombre de membres	Fraction	Nombre de membres élus	Fraction
Europe occidentale . . .	17	0,77	7	0,58
Europe orientale	2	0,09	2	0,17
Amérique du Nord . . .	2	0,09	2	0,17
Asie	1	0,05	1	0,08
Moyen-Orient	0	0	0	0
Amérique latine	0		0	0
Australie	0	0	0	0
Afrique	0	0	0	0
Totaux	22	1,00	12	1,00

La table II montre la répartition du Bureau entier et la répartition des 12 personnes (autres que le Secrétaire général et le Trésorier honoraire) élues par le Conseil.

Table III – Distribution géographique du Comité exécutif

Région géographique	Nombre de membres	Fraction	Nombre de membres élus	Fraction
Europe occidentale . . .	5	0,71	3	0,60
Europe orientale	1	0,14	1	0,20
Amérique du Nord . . .	1	0,14	1	0,20
Asie	0	0	0	0
Moyen-Orient	0	0	0	0
Amérique latine	0	0	0	0
Australie	0	0	0	0
Afrique	0	0	0	0
Totaux	7	0,99	5	1,00

La table III donne les mêmes renseignements pour le Comité exécutif.

Il est bien évident que l'Europe occidentale a une représentation trop haute dans les groupes qui prennent les décisions pour la conduite de l'Union. Jusqu'en 1955, le Comité exécutif (établi après la Seconde Guerre mondiale) consistait exclusivement de chimistes de l'Europe occidentale.

A ce point, il conviendrait de parler des fonctions du Président. Il est élu pour 4 ans. Il préside aux séances du Conseil, du Bureau et du Comité exécutif. S'il ne résidait pas en Europe occidentale, il lui serait très difficile de se tenir au courant des activités journalières de l'Union.

Les Présidents devraient être choisis dans n'importe quelle parties du monde. Pour qu'ils se familiarisent avec toutes les activités de l'Union, ils devraient remplir le poste de Vice-Présidents pendant deux ans; l'un des Vice-Présidents devrait être désigné «Président-Elu». S'ils ne résident pas en Europe occidentale, on doit prévoir au budget une somme suffisante pour permettre au Président et au Vice-Président qui est «Président-Elu» d'assister à la séance annuelle du Bureau. Le Président doit aussi assister chaque année à la réunion du Comité exécutif. Il devrait continuer à être membre du Comité exécutif et du Bureau pendant deux ans après l'expiration de son terme.

Nous arrivons maintenant à la question de la distribution géographique des membres du Bureau et du Comité exécutif et certaines recommandations semblent nécessaires. Il faut reconnaître que la plupart des membres ex officio viendront sûrement de l'Europe occidentale et de l'Amérique du Nord. Il en sera de même pendant un certain temps pour le Trésorier honoraire, le Secrétaire général, le Président et le «Président-Elu». Des 10 personnes que le Conseil doit élire, 3 au minimum devraient être choisies en dehors de l'Europe occidentale et de l'Amérique du Nord; il serait préférable que pas plus de 5 ne viennent de l'Europe occidentale. On devrait éviter aussi que 2 de ces personnes viennent du même pays.

Ainsi, la distribution des membres du Bureau pourrait être temporairement comme suit:

Président: probablement de l'Europe occidentale ou de l'Amérique du Nord jusqu'en 1967.

Vice-Président, désigné comme «Président-Elu»: probablement de l'Europe occidentale jusqu'en 1965.

Secrétaire général: Europe occidentale.

Trésorier honoraire: Europe occidentale.

8 Membres ex officio: la plupart de l'Europe occidentale et de l'Amérique du Nord.

Membres élus: 2, au minimum, de l'Europe orientale et 2 de l'Amérique du Nord (ces nombres seraient réduits si le Président, le «Président-Elu», ou l'un des Anciens Présidents venaient de ces régions). 3 de l'Europe occidentale et 3 de pays autres que ceux dont nous venons de parler.

Ce sont seulement des suggestions; il faut évidemment tenir compte de facteurs autres que la distribution géographique.

Faisons maintenant une revue rapide de l'histoire de l'Union depuis 1959 et jetons un regard vers l'avenir.

Le Bulletin d'Information fut fondé par le Secrétaire général pour que les membres de l'administration, les membres des commissions et les membres des groupements nationaux soient tenus au courant des travaux de l'Union. Il a eu un grand succès et a bien rempli sa fonction. Il devrait être tiré à un plus grand nombre d'exemplaires et distribué sur une superficie géographique plus étendue. On en imprime maintenant 2500 exemplaires de chaque numéro; on pourrait bien porter ce nombre à 10000 et faire du Bulletin le véritable journal de l'Union. Nous suggérons que les différents groupements nationaux en achètent des exemplaires supplémentaires pour distribuer dans leurs pays respectifs. C'est vraiement la meilleure façon de faire de la publicité pour l'Union.

En septembre 1960 parut le premier numéro du nouveau «Journal de Chimie Pure et Appliquée».

Le Comité de publications et particulièrement son Directeur Dr H.W. Thompson, méritent beaucoup d'appréciation et de gratitude de la part de l'Union pour avoir mené à bien les négociations difficiles qui ont résulté en la publication de ce nouveau journal.

Nous devons décrire, ici, en quelques mots, ce nouveau journal. Il ne sollicite pas de contributions et n'accepte pas les contributions volontaires. Son rôle est de publier les articles présentés aux symposia, colloquia et autres réunions sous l'égide de l'Union.

Pour que ce nouveau journal ait du succès, l'Editeur et le Comité éditorial doivent avoir le privilège de choisir parmi les articles ceux qu'ils désirent publier. Il est évident qu'il ne serait pas désirable de publier tous les articles: certains n'en vaudraient pas la peine pour des raisons scientifiques; le sujet d'autres serait plus approprié à la publication dans d'autres journaux. La réussite de ce nouveau «Journal de Chimie Pure et Appliquée» dépendra

d'une coopération complète de la part des organisateurs des réunions et, de son côté, le Rédacteur du Journal devra promptement renvoyer les manuscrits qu'il ne désire pas publier.

Il ne sied pas de donner ici les détails du contrat entre l'Union et Butterworth. Disons seulement que l'Union recevra peut-être quelque revenu du nouveau Journal, mais le montant dépendra du nombre des abonnés. Nous espérons que tous les chimistes et particulièrement les groupements nationaux inciteront les bibliothèques, les universités, les industries et les individus à s'abonner au «Journal de Chimie Pure et Appliquée».

Les rapports des Présidents de Section doivent décrire en détail les travaux accomplis par les différentes Sections. Puisque le travail fondamental de l'Union se fait dans les Sections, le Président de chaque Section devrait, à mon avis, présenter un bref rapport oral aux réunions du Conseil.

Les Présidents de Section sont choisis par leurs collègues pour représenter des sujets scientifiques spécialisés. De plus en plus ce sont les Sections qui devraient exclusivement s'occuper des activités scientifiques, l'administration et le Bureau intervenant le moins possible. Le Bureau devrait demander aux Présidents de Section de se réunir au moins une fois par an afin que le Bureau et le Conseil puissent profiter de leurs opinions au sujet des programmes et de la marche à suivre.

La question d'autonomie pour les Sections est intimement liée a la situation financière. Nous traiterons de cette question plus tard, mais un aspect du problème doit être mentionné ici. Le revenu de l'Union n'est pas élevé et le Comité exécutif doit continuellement faire face au problème de distribuer avec justice ces ressources très restreintes; il n'y a pour ainsi dire pas de fonds de réserve. Les Sections sont donc obligées par la nécessité d'opérer dans les limites d'un budget bien établi et dûment approuvé. Malheureusement, ce budget doit être approuvé item par item et une économie sur un item ne peut pas être reportée sur un autre sans obtenir l'approbation du Trésorier honoraire et du Secrétaire général. Il en est ainsi parce que des dépenses imprévues surviennent toujours et l'administration de l'Union doit toujours contrôler si une certaine dépense est justifiée.

A part cette restriction budgétaire gênante, on devrait donner aux Sections une grande liberté d'action. Pour profiter de cette liberté, elles doivent avoir des secrétariats en fonction permanente. Là encore, la situation financière limite sérieusement la possibilité de voyager et d'employer des secrétaires compétents.

Présentons, ici, quelques considérations d'ordre général au sujet des Sections.

La distinction entre la chimie «pure» et la chimie «appliquée» a toujours été vague. En général, les «chimistes appliqués» qui comprennent les ingénieurs chimistes ne s'intéressent pas beaucoup à l'Union. Il y a, naturellement, de notables exceptions.

Une orientation croissante vers la chimie appliquée semble inévitable. Les standards pour le commerce international, le problème international de la pollution de l'eau et de l'air, la toxicologie industrielle, sans parler de notre système traditionnel de nomenclature: symboles, unités, constantes sont d'une importance croissante dans le domaine de la chimie appliquée.

Partout, il faut s'attendre à l'expansion de l'industrie chimique et certains des pays nouvellement indépendants demanderont de l'aide sur ces sujets importants. Partout où la chimie est établie, l'Union doit être prête à donner des conseils, à envoyer des représentants aux autres sociétés internationales, et doit savoir quand il est opportun d'offrir ses services dans l'intérêt de l'avancement de la chimie.

Il y a des horizons, à peine entrevus en ce moment, pour lesquels une structure administrative sera nécessaire. Pour cela, il faudra de l'argent, mais nous croyons qu'il sera possible d'en trouver; les mesures d'organisation nécessaires seront prises.

Certaines personnes craignent que la Section de Chimie appliquée ne devienne plus importante que les autres. Il n'a pas de quoi s'inquiéter; c'est inévitable et probablement désirable. Plus de 80 pour cent des chimistes du monde sont des chimistes appliqués, mais ils reconnaissent, presque à l'unanimité, que tout progrès à longue échéance dépend de la chimie «pure».

Nous devons donc reconnaître et même encourager un développement considérable de la Section de Chimie appliquée, lui permettant même éventuellement d'avoir son propre système de finances. La mesure la plus urgente est la création d'un secrétariat capable d'assumer la lourde tâche qui, sûrement, lui incombera.

Parlons maintenant des accomplissements très importants des autres sections.

De temps mémorial, les poids atomiques chimiques ont été basés sur une échelle donnant exactement 16,000 comme poids atomique de l'oxygène ordinaire. Ce n'est que vers l'année 1930 que Giauque et ses collaborateurs prouvèrent que l'oxygène avait plus d'un isotope. Puisque la proportion isotopique varie d'une partie du monde a l'autre, les poids atomiques devinrent quelque peu indéfinis et les physiciens qui s'occupent des poids d'isotopes uniques choisirent 16,000 pour l'oxygène-16. Cela créa une confusion et il devint impératif que les physiciens et les chimistes coopèrent pour établir une échelle de poids atomiques ayant leur approbation mutuelle. Les discussions furent quelque fois acrimonieuses, mais, finalement, il fut démontré qu'en prenant exactement 12,000 comme poids atomique du carbone-12, on pouvait en même temps fournir aux physiciens un seul isotope comme standard et ne causer qu'un changement minimum et insignifiant dans les poids atomiques chimiques. C'était essentiel à cause du commerce; certaines lois sont basées sur les poids atomiques chimiques.

Nous sommes heureux de rapporter que l'Union internationale de Physique pure et appliquée et l'Union internationale de Chimie pure et appliquée se sont mises d'accord pour accepter le poids atomique du Carbone-12 de 12,000 exactement comme base de tous les poids atomiques. C'est une grande étape accomplie dans l'histoire de la Chimie et de la Physique; nous offrons notre sincère gratitude à tous ceux qui ont pris part à ces négociations difficiles et surtout aux membres anciens et présents de l'administration de notre Section de Chimie inorganique.

Il est probable qu'aucune commission de l'Union ne travaille plus dur que celle de la Nomenclature. Après de longues délibérations et bien des formalités, les rapports sur la nomenclature inorganique et organique ont été approuvés et publiés, d'abord sous forme de livre par Butterworth puis, après traduction, dans quelques-uns des journaux de chimie ayant une grande circulation mondiale. Plus de 30000 exemplaires de ces règlements ont été imprimés et pour un prix modique on peut les acheter un peu partout.

Il serait difficile d'énumérer toutes les personnes à qui est dû le succès remarquable du travail sur la nomenclature, mais nous devons tout au moins citer le nom du Prof. Verkade qui depuis des années s'est intéressé à la nomenclature organique.

La question des symboles pour la Chimie physique et particulièrement pour ces quantités qui intéressent les physiciens et les ingénieurs a présenté beaucoup de difficultés. Elle a même brisé bien des amitiés. C'est un fait

que, dans la même université, on peut trouver des professeurs se servant de symboles différents pour exprimer les mêmes choses.

Tous les problèmes que comportent les symboles physico-chimiques sont loin d'être résolus, mais un grand progrès a été accompli et un rapport a été publié par Butterworth et dans plusieurs journaux scientifiques. De nouveau, nous exprimons notre gratitude à tous les membres de la Section de Chimie physique.

Il serait impossible de donner ici une liste de tous les rapports importants qui ont paru sous les auspices de l'Union et une telle liste ne serait pas à sa place dans une courte allocution présidentielle. J'espère que personne ne se sentira lésé si je m'arrête à ce point.

Les membres de l'administration de l'Union se sont depuis longtemps rendu compte que les activités de l'Union devraient s'étendre sur une plus grande superficie géographique. Au printemps 1959, le Comité exécutif se réunit à Moscou et en mai 1960 le Bureau tout entier se réunit à Leningrad, et de là se rendit à Moscou ayant été invité par l'Académie des Sciences de l'URSS. Nous remercions bien sincèrement nos collègues russes pour leur cordiale hospitalité. Pendant l'été 1960 un Symposium sur les Produits naturels se réunit en Australie. Il eut un grand succès. L'Union était représentée par le Prof. STOLL en sa qualité d'Ancien Président et la Section de Chimie organique était représentée par son Président, le Prof. ERDTMAN.

Un Symposium sur la Spectroscopie aura lieu au Japon en 1962 et le Comité exécutif s'y réunira. Il est possible que le Comité exécutif se réunisse bientôt dans l'Inde.

Ces réunions organisées hors de l'Europe occidentale et de l'Amérique du Nord sont un bon commencement mais ce n'est pas suffisant. La plupart des membres du Comité exécutif sont assez âgés; nous devons trouver le moyen d'avoir des réunions de Sections et de Commissions un peu dans tous les pays et d'y envoyer des membres très actifs dans leurs spécialités respectives. Il faut donner aux chimistes du monde entier l'impression que l'Union internationale de Chimie pure et appliquée s'intéresse à eux. Pour cela, il nous faudra trouver des ressources financières.

La nouvelle échelle de cotisations nationales a été approuvée à Munich en août 1959; le Bureau a plus tard donné aussi son approbation et, à partir de janvier 1961, l'Union recevra les nouvelles cotisations. Il est encore trop tôt pour prévoir la somme que recevra l'Union. Elle pourrait s'élever à 70000 dollars, ce chiffre comprenant une petite subvention de l'Unesco par l'entremise du Conseil international des Unions scientifiques. Pour l'année 1961, on a approuvé un budget de plus de 100000 dollars à cause des séances à Montréal. Pour progresser et se réunir en Asie, au Moyen-Orient, en Afrique, en Europe orientale, comme il le faudra éventuellement, un budget de plusieurs centaines de mille dollars serait nécessaire.

Non seulement les réunions devraient avoir lieu dans les diverses régions géographiques, mais encore l'organisation tout entière de l'Union devrait être renforcée pour faire face à l'avenir.

Nous désirons mentionner ici le grand dévouement du Secrétaire général. Il accomplit ses fonctions avec un grand zèle et au prix d'un sacrifice personnel considérable. Nous lui devons beaucoup. Les dépenses du secrétariat sont défrayées par des compagnies chimiques de Bâle et l'Union de Banques Suisses gère ses affaires financières. Je veux leur exprimer, ici, notre sincère gratitude.

Le service personnel et non rémunéré ne saurait suffire et il impose des limitations; le développement de l'Union rendant le fardeau de plus en plus lourd, il est indispensable d'établir un secrétariat pouvant compter sur un budget suffisant et régulier.

Il nous faut faire des projets pour l'avenir et avoir des recommandations à présenter. Nous demandons au Conseil de permettre au Bureau de préparer un programme pour l'avenir en vue d'obtenir une action définie à la réunion du Conseil en 1963.

Je ne veux pas terminer sans mentionner notre Trésorier honoraire qui a accompli ses devoirs avec une fidélité exceptionnelle.

Mon travail, en collaboration avec tous les membres du Bureau et du Comité exécutif, a été pour moi un grand plaisir.

W. A. Noyes Jr., Président

RAPPORT BIENNAL DU TRÉSORIER 1959–1960

1º *Introduction*

La tradition établie par le Trésorier de présenter tous les deux ans un rapport et d'en discuter les chiffres, offre le grand avantage de couvrir une période comprenant une année avec et une année sans Conférence, c'est-à-dire une année très coûteuse et une autre dont les dépenses sont réduites. Il est bien entendu toutefois qu'un bilan est établi chaque année.

Lors de la Conférence de 1959, il a été souligné que l'IUPAC était dans une période de transformation, aussi bien du point de vue activité que finances. Donnant suite à la décision prise par le Conseil en 1959, nous avons essayé de rémunérer les membres titulaires d'une manière plus équitable. Cette mesure provisionnelle et une activité accrue, s'étendant toutes deux sur les deux ans, ont déjà eu des répercussions financières se traduisant par un **déficit** de plus de **$15000.**

2º *Revenu*

a) Revenu indirect UNESCO – ICSU

Le revenu indirect provenant de l'UNESCO, par l'intermédiaire de l'ICSU, a continué à diminuer, ainsi que le démontre le tableau ci-dessous:

Année	Subvention de l'ICSU $
1955	18 439
1956	16 500
1957	15 500
1958	15 000
1959	15 000
1960	11 000

b) Revenu direct de l'Union

Les très intéressantes propositions soumises par le Comité des Finances, désigné par le Conseil en 1959 et présidé par le Professeur A. Tiselius, ancien Président de l'IUPAC, furent approuvées en principe par le Conseil à Munich. Il fut suggéré entre autres que la partie essentielle de tout projet tendant à accroître le revenu de l'Union serait une augmentation substantielle des contributions annuelles payées par les pays membres. Il fut donc recommandé au Conseil d'étudier un tableau prévoyant un plus grand nombre de catégories de membres.

Toutefois le Conseil a décidé, pour 1960, de maintenir les contributions des pays membres au même taux que celui décidé à Stockholm en 1953, c'est-à-dire:

Catégorie A	$ 1300
Catégorie B	$ 800
Catégorie C	$ 450

Eu égard à la proposition du Comité des Finances, quelques pays (tels que l'Allemagne et le Royaume-Uni par exemple) ont pourtant déjà augmenté de plein gré leurs contributions annuelles. Un groupe de chimistes américains a également continué à contribuer au paiement des dépenses croissantes de l'IUPAC. Le revenu total provenant des pays membres est le suivant:

1957	1958	1959	1960
$	$	$	$
23 312,28	27 918,20	27 256,15	34 188,98

Une fois de plus, il n'y a que quelques cotisations arriérées et ce poste disparaîtra bientôt complètement. Le Venezuela qui, depuis de nombreuses années, ne paie plus sa contribution annuelle, a présenté sa démission. Le Conseil devra prendre une décision appropriée à ce sujet. Les cotisations arriérées dues par ce pays ne figurent plus au bilan.

Le développement du poste Intérêts et Dividendes est démontré ci-dessous:

1955	1956	1957	1958	1959	1960
$	$	$	$	$	$
1741	2983	4120	5315	4921,33	6528,46

Le dernier poste du revenu, la vente des publications par le Secrétariat général, accuse une tendance à la baisse que nous attendions, étant donné le nouvel arrangement conclu avec la maison d'édition de l'Union.

Le revenu total est le suivant:

			$	$
Revenu direct				
1959			32 418,28	
1960			41 410,02	73 828,30
Subventions de l'ICSU				
1959	15 000 + 1 522,47	=	16 522,47	
1960	11 000 + 344,20*	=	11 344,20	27 866,67
Grand total pour les deux années				101 694,97

* y compris remboursement de la Deutsche Bunsengesellschaft.

(Nous présentons chaque année des comptes à l'ICSU pour les fonds fournis par cet organisme.)

3º *Dépenses*

a) Frais de voyage

Dans une organisation scientifique internationale, dont le but principal est l'établissement d'une coopération permanente entre les sociétés chimiques des pays membres et la coordination de leurs activités scientifiques et techniques (voir Statuts), les frais de voyage sont un des facteurs essentiels garantissant le succès de ses efforts. C'est pourquoi ce poste est l'un des plus importants des dépenses de l'IUPAC.

La décision suivante prise en 1959 par le Conseil:

«i) de supprimer la limite de $400
ii) de payer dans une mesure aussi large que possible le voyage aller et retour en classe touriste (avion), ainsi qu'en décidera le Comité exécutif d'après les finances de l'Union
iii) de payer tous les frais de séjour à un taux fixé par le Comité exécutif
iv) de prier le Comité des Finances de faire des propositions en vue de trouver les sommes nécessaires à ces paiements
v) de créer des réserves appropriées afin de sauvegarder les activités de l'Union en cas d'urgence

vi) de convoquer, malgré les grandes dépenses occasionnées à cet effet, le Bureau de l'Union chaque année pour une réunion, car un contact et une collaboration plus étroits sont nécessaires»

s'est traduite en 1960 par une augmentation des dépenses relatives aux frais de voyage.

Les Sections, Divisions et Commissions ont été priées à maintes reprises, afin de réaliser des économies, de réduire autant que possible le nombre des membres titulaires bénéficiant du remboursement de leurs frais de voyage et de séjour. Dans la plupart des cas, cette demande a été accueillie favorablement. D'autre part, les Sections, Divisions et Commissions ont été invitées à prévoir une meilleure répartition géographique des membres titulaires. Jusqu'à tout récemment l'IUPAC était, en effet, limitée à l'Europe occidentale. Or, l'extension ces dernières années de son activité à d'autres continents, et spécialement outre Atlantique, a eu de sérieuses conséquences dépassant de loin les économies réalisées par la réduction du nombre des membres titulaires.

Pour le Trésorier, la réduction du nombre total des membres titulaires sera profitable aux finances de l'Union. Néanmoins, une telle mesure risque de provoquer une diminution de l'intérêt pour les affaires de l'Union, de nombreux petits pays ne pouvant plus être représentés, même par un seul membre titulaire. Ceci est le cas particulièrement pour la Section de Chimie appliquée.

b) Publications

Coût des publications

1953	1954	1955	1956	1957	1958	1959	1960
$	$	$	$	$	$	$	$
5743	2933	139	7652	2915	8065	4128,69	10162,69

c) Frais administratifs

Comme les années précédentes, les dépenses administratives sont extrêmement basses et nous en sommes particulièrement reconnaissants aux autorités qui accomplissent leur tâche bénévolement, nous permettant ainsi de réaliser une économie considérable. Ceci est également le cas de l'Union de Banques Suisses qui s'occupe – sans aucun frais pour l'Union – des comptes et de la correspondance y relative.

d) Coût d'impression et d'expédition du Bulletin d'Information

Ainsi que le Conseil l'a décidé et selon la recommandation du Comité de Rédaction, le Secrétaire général a été prié de continuer la rédaction du Bulletin d'Information. Il fut également décidé que les recommandations provisoires seront imprimées dans le Bulletin d'Information et que, seules, les règles définitives seront publiées dans le Journal. Les frais d'impression et d'expédition du Bulletin d'Information s'élèvent à **$ 3143.—** et **$ 2679.—** respectivement.

e) Investissements et taxation

La plupart des investissements de l'IUPAC sont des valeurs britanniques. Nous avons reçu à plusieurs reprises des rappels du service de taxation. En 1959, le montant des taxes dues en Grande-Bretagne fut de $942,31, alors qu'en 1960, il fut de $641,7. Le Bureau et le Conseil devront décider s'il convient d'accepter une augmentation des impôts en Grande-Bretagne, ou si les investissements devraient être transférés dans un pays plus favorable à l'Union, du moins au point de vue fiscal.

Nous avons demandé l'avis de banquiers et d'hommes de loi, qui estiment qu'il n'y aurait aucun avantage particulier à transférer nos investissements ou notre siège.

f) Colloques

Les dépenses très importantes de 1960 (année sans Conférence) furent spécialement occasionnées par des colloques en Australie et à Edimbourg. Ils connurent un grand succès, mais les conséquences financières de telles activités ne sont certes pas négligeables.

4º Bilan

Les comptes des recettes et dépenses, pour 1959–1960, accusent un **déficit** de **$15 427,44,** le revenu total étant de $101 694,97 et les dépenses de $117 122,41. Le bilan au 31 décembre 1960 est donné ci-après. Pour alléger la disposition de ce bilan, seuls les montants totaux y figurent, mais toute personne désirant d'autres détails est priée de le faire savoir.

Les comptes des recettes et dépenses ont été contrôlés par une fiduciaire, selon rapport ci-joint. L'idée exprimée dans le rapport 1957–1958 n'a pas été retenue, certains membres ayant estimé que seule une fiduciaire peut procéder à un contrôle en règle, et que les dépenses y afférentes sont justifiées.

5º Investissements

Le Comité exécutif a décidé que, dans la mesure du possible, aucun changement ne devrait intervenir dans les investissements. Cette décision devra être confirmée par le Conseil comme une règle générale de conduite.

6º Budget

Le budget proposé pour 1961 a été imprimé dans le Bulletin d'Information nº 12, selon tiré à part ci-joint.

L'établissement du budget pour 1962 présente deux difficultés principales:

a) une somme d'environ $25 000 devra être prévue pour le remboursement de l'emprunt à court terme;

b) le programme d'activité et donc les dépenses de deux Sections, dont le Comité doit être renouvelé, sont imprévisibles pour le moment.

Le budget 1962 doit donc être considéré comme une estimation approximative (voir annexe). Le budget final doit être décidé par le Conseil.

7º Perspectives financières pour l'avenir

Comme Trésorier, j'insiste sur le fait qu'un tel déficit ne doit plus se reproduire, si l'on ne veut pas avoir à faire face aux mêmes difficultés que d'autres organisations internationales ne disposant d'aucunes réserves. Si l'IUPAC devait se trouver elle-même dans une telle situation, toute son activité serait paralysée. Des rumeurs ont circulé selon lesquelles l'IUPAC aurait accumulé des réserves injustifiées. Ceci doit être démenti officiellement, car les valeurs formant nos réserves datent partiellement d'avant-guerre et proviennent en partie de contributions de quelques pays membres ayant payé leur cotisation durant la guerre, alors que toute activité de l'IUPAC était impossible. Il doit également être rappelé que les réserves de l'IUPAC seraient complètement épuisées si ses autorités n'avaient accompli leur immense travail d'une façon entièrement bénévole. On peut donc se demander qui aurait le droit de disposer de ces réserves.

Il reste encore trois problèmes très urgents, pour lesquels nous n'avons pas trouvé de solution jusqu'à présent:

a) Paiement du montant total des frais de voyage

Nous avons toujours pensé que la limitation des frais de voyage à $400 par voyage est un sérieux handicap pour de nombreux membres de Commissions. Toutefois, malgré la décision du Conseil de supprimer cette limitation, il n'y aura pas assez d'argent disponible en 1961 pour payer plus de $400, comme ce fut le cas jusqu'ici.

b) Frais de séjour

La structure de l'IUPAC d'une part, et l'augmentation du coût de la vie d'autre part, ne nous permettront de continuer nos activités avec succès qu'à la condition de rembourser intégralement le montant des frais de séjour à tous ceux qui accomplissent un travail effectif. Ici, aussi, nos ressources limitées ne nous le permettent pas.

c) Rémunération des activités scientifiques et administratives

Les Sections et la plupart des Divisions et Commissions devront tôt ou tard être mises en mesure d'assumer les frais d'un secrétariat. Si l'Union veut remplir toutes ces exigences et accomplir un travail efficace et utile, il ne lui est plus possible de travailler avec un revenu limité. Ainsi que le Comité *ad hoc* des Finances – nommé lors de la Conférence de 1959 – l'a souligné, à part une augmentation générale des contributions annuelles, d'autres sources de revenu doivent être trouvées. En ce qui concerne l'appel aux pays membres, les invitant à augmenter volontairement leur contribution annuelle, nous devons reconnaître que quelques pays ont répondu d'une manière très généreuse. Les contributions annuelles doivent être adaptées à l'importance de la chimie dans le pays en question, en prenant l'échelle de l'UNESCO comme base. Pour les pays, dans lesquels la chimie joue un rôle très important, une contribution supplémentaire, dépassant l'échelle normale de l'UNESCO, devrait être imposée. Lorsque la contribution n'est pas proportionnelle aux dépenses occasionnées et/ou à l'importance de la chimie dans l'économie nationale, il serait peut-être possible d'obtenir de meilleurs résultats à l'avenir en définissant plus exactement le terme d'« organisme adhérent ». Il devrait être prévu dans les Statuts un article stipulant que l'organisme national représente valablement soit les autorités scientifiques, soit la chimie industrielle dans le pays en question. Ce problème ne se limite pas aux considérations financières.

La Conférence de Montréal est une nouvelle expérience. Ce sera la seconde fois qu'une Conférence a lieu hors de l'Europe occidentale. Nous ne pourrons faire face aux dépenses extraordinaires qu'elle occasionnera qu'en effectuant un emprunt à court terme, les contributions annuelles étant dans de nombreux cas insuffisantes et n'étant normalement payées qu'à la fin de l'année.

7° *Remerciements*

Toute ma gratitude va aux organismes nationaux dont les contributions annuelles sont la base de nos ressources. Des économies supplémentaires ont pu être réalisées grâce à la générosité des organisateurs de la Conférence de 1959, qui ont payé les frais de voyage et de séjour aux membres titulaires chargés de donner une conférence générale ou de section.

Je dois également exprimer ma reconnaissance à l'Union de Banques Suisses, particulièrement à M. G. HANSELMANN, Mademoiselle L. SOMMERHALDER et M. H. BAUMANN, qui ont accompli un immense travail pour nous, ceci sans aucun frais pour l'Union.

Des remerciements sont également dus à ma secrétaire, Mrs. E. BARRON, et à Mrs. T. BRABAZON et au Dr D. C. MARTIN de la Royal Society.

BUDGET PROPOSÉ POUR 1962

Le budget de 1962 doit couvrir les dépenses ordinaires de 1962 et compenser une partie du déficit de 1961. Il sera nécessaire de limiter les dépenses et d'augmenter les revenus, de manière à ce que l'exercice 1962 boucle par un excédent d'au moins $20000.

A. – Revenu

Le revenu en 1962 sera vraisemblablement le suivant:

	$
pays membres	52 800
ICSU	14 000
intérêts et dividendes	2 000
	68 800

B. – Dépenses

a) Les dépenses fixes annuelles seront:

	$	$
Frais de voyage et dépenses administratives – Président		1 200
Frais de voyage Trésorier et dépenses administratives – Royal Society		1 244
Frais de voyage – Secrétaire Général		1 100
Dépenses administratives – Secrétariat général		
assistantes salaires	5 300	
assistante anglaise salaire	3 000	
caisse pension – assistante	2 210	
matériel de bureau, stencils, etc.	2 620	
taxes postales	1 715	
télégrammes	85	
téléphones	100	
loyer des bureaux	930	
services techniques, impression	155	
photocopies	63	
traductions	465	16 643
Réunion du Bureau		10 000
Réunion du Comité exécutif (Japon)		9 291
Comité de Rédaction		1 582
Editeur scientifique		1 280
Butterworths		2 630
Comptes Rendus		6 000
Bulletin d'Information		2 775
Taxes dues en Grande-Bretagne		1 000
2% Contributions à l'ICSU		600
b) Remboursement partiel de l'emprunt		13 455
		68 800

C. – Montant à disposition des Sections

Nihil.

RAPPORT DU COMITÉ AD HOC DES FINANCES

Les affaires financières de l'Union sont trop complexes pour être traitées par un Comité ad hoc qui se réunit un jour ou deux. En fait, nous pensons que les problèmes financiers de l'Union ne seront jamais résolus pour la simple raison que plus elle aura d'argent à sa disposition, plus l'Union aura aussi de projets. Pour le moment, nous ne désirons qu'attirer l'attention sur certains aspects de la situation financière de l'Union et suggérer quelques mesures qui pourraient être d'un certain profit.

Bien que l'Union ne soit pas en face d'un danger financier immédiat, les arrangements actuels sont précaires et des démarches devraient être entreprises afin de les modifier aussitôt que possible. Nous apprécions très vivement l'aide généreuse de Hoffmann-La Roche, Ciba, Geigy et Sandoz concernant le bureau du Secrétariat Général et espérons que ces compagnies voudront bien continuer à soutenir les activités de l'Union de cette manière, mais on doit se rendre compte qu'elles pourraient ne pas toujours être en mesure de le faire. Des démarches doivent être entreprises afin de se mettre en garde contre une telle possibilité. Ceci nécessite un revenu garanti et permanent.

Le bilan de chaque organisation peut être amélioré de deux manières: soit en dépensant moins, soit en augmentant les recettes. Bien que nous désirions certainement diminuer les dépenses autant que possible, nous savons que les activités croissantes de l'Union requerront un budget toujours plus élevé. En fait notre première recommandation autorise le Bureau à dépenser des sommes dans une telle proportion comme ce ne fut jamais le cas jusqu'à présent. Quelques pays membres, qui sont des membres actifs de l'Union, n'ont aucun représentant dans des Commissions ou Comités si bien que le bénéfice qu'ils peuvent retirer de l'Union en est grandement réduit. Le Comité ad hoc des Finances recommande que le Bureau soit autorisé à payer des frais de voyage et de séjour pour un délégué de chacun de ces organismes adhérents aux Conférences de l'Union.

Afin de réaliser des économies, le Comité propose 3 recommandations:

1° Selon la suggestion faite par Sir Alexander Todd, nous suggérons que les futures Conférences aient lieu généralement en Europe occidentale. Lorsque cela sera possible, elles devraient être tenues en parallèle avec des Congrès, mais il n'est pas toujours nécessaire qu'il y ait relation entre les Conférences et les Congrès, car ces derniers devraient avoir lieu dans des endroits aussi variés que possible. Lorsqu'un Congrès n'est pas tenu parallèlement avec une Conférence, un symposium ou une série de conférences pourraient être arrangés pour ceux qui désirent un programme scientifique.

2° Le charter flight qui a amené les délégués d'Europe à Montréal pour cette Conférence a prouvé que de tels vols sont possibles et permettent de réaliser de grandes économies à l'Union. Il est à recommander que le Bureau soit autorisé à décider lors de chaque Conférence si des charter flights devraient être prévus. Si de tels arrangements sont faits, les délégués auraient le choix entre voyager par charter flight ou recevoir comme frais de transport l'équivalent du tarif du charter flight.

3° Il est recommandé que les organismes adhérents soient priés de payer ou d'arranger le paiement des frais de voyage et de séjour de leurs membres titulaires toutes les fois que cela est possible. Ces paiements doivent être considérés comme contribution à l'Union.

En ce qui concerne un revenu plus élevé, il est vivement souhaitable qu'une source permanente de revenu soit trouvée qui supprime l'obligation de lancer un appel de fonds chaque année. Ce n'est que de cette manière que l'Union peut être sûre de pouvoir réaliser ses projets à longue échéance.

Le revenu doit provenir de différentes sources dans de nombreuses parties du monde.

Quelques sources sont:

a) Contributions de l'industrie. Pour qu'un programme d'appel de fonds à l'industrie soit couronné de succès, les détails concernant l'exemption d'impôts, l'emploi des fonds et les buts précis poursuivis par l'Union doivent être mis au point et exposés clairement. Vu l'importance et l'activité croissantes de notre Section de Chimie appliquée, les directeurs d'industrie devraient être priés de suggérer de quelle manière l'Union pourrait leur être utile. Ils pourraient ainsi comprendre la nature de l'Union et sa valeur pour l'industrie chimique.

Etant donné que les lois fiscales, les systèmes économiques et les coutumes des organismes adhérents de l'Union diffèrent beaucoup, il ne semble pas possible de proposer un plan uniforme d'appel de fonds dans les différents pays. Il est préférable de recommander qu'une personne (ou peut-être 2 ou 3) soient désignées à titre honoraire dans chaque pays afin d'examiner les moyens les plus efficaces et utiles de récolter des fonds dans ce pays et de réaliser un tel programme. Ces représentants nationaux doivent rester en contact les uns avec les autres, soit directement, soit par l'intermédiaire du Secrétariat général afin de s'aider mutuellement et de créer ainsi une compétition amicale dans cette question des contributions à l'Union.

b) Contributions des sociétés chimiques. Etant donné que le travail de l'Union évite aux sociétés nationales une grande somme d'efforts et de dépenses, et profite ainsi à tous les chimistes, les sociétés devraient être prêtes à soutenir financièrement l'Union.

c) Contributions des Gouvernements ou divisions gouvernementales, au moins pour aider certaines activités de l'Union. Par exemple, les Départements des Affaires étrangères pourraient être priés de payer les frais de voyage et de séjour des délégués de leur pays respectif aux Conférences.

d) Dons de fondations philanthropiques et dons individuels.

Finalement, le Comité ad hoc des Finances recommande que lorsque l'occasion le permet, les fonds qui sont maintenant investis en obligations du Gouvernement et autres fonds disponibles pour investissements soient réinvestis en actions de compagnies établies qui s'intéressent aux travaux de recherche en chimie. Nous pensons que sur une période de plusieurs années ceci augmenterait considérablement le revenu de l'Union.

SUGGESTION CONCERNANT LES LIEUX DES FUTURES CONFÉRENCES

Il a toujours été de tradition à l'Union de réunir tous les deux ans une conférence officielle comprenant le Conseil, le Bureau, les Comités de Sections et les Commissions et, du moins récemment, ces réunions ont été associées à un Congrès international. Pour de nombreuses raisons, il est clair que ces Congrès doivent être tenus dans les diverses parties du monde. Il semblerait également souhaitable que l'Union, en tant qu'organisme international, tienne au moins quelques-unes de ses réunions dans des pays divers. La politique précédente suscite des difficultés financière à l'Union, et cette situation risque même de s'aggraver vu l'accroissement continuel des activités de l'Union. L'ampleur de ces problèmes financiers peut être mise en évidence par le fait qu'une conférence de l'Union à Montréal, comme actuellement, ou à Moscou, entraîne une augmentation des dépenses d'environ $100000 par rapport à la tenue de la même réunion en Europe occidentale. Etant donné que ces frais consistent essentiellement en frais de voyage et subsistance pour les membres titulaires, on peut en déduire que l'Union est vraiment extravagante. Je crois qu'il est possible pour l'Union d'éviter cette critique et par la même occasion d'agir avec plus d'efficacité en adoptant une nouvelle manière de faire.

Selon les Statuts, le Bureau doit se réunir une fois par an, et le Conseil (c'est-à-dire la Conférence générale de l'Union) au moins une fois tous les deux ans. Mais il n'existe aucun règlement stipulant que la Conférence doit être associée à un Congrès, et aucune restriction quant à l'endroit où la Conférence ou la réunion des Commissions doivent avoir lieu.

C'est pourquoi j'aimerais proposer:

1° que, la Conférence générale de l'Union dorénavant se tienne en Europe occidentale, et de préférence dans la ville où réside le Secrétariat général. Autant que possible, les réunions des Commissions devraient également y être tenues, ou dans tout autre lieu plus avantageux.

2° que, les années de non-conférence, une rotation géographique soit autorisée pour les réunions du Bureau et du Comité exécutif, comme c'est le cas actuellement pour la Conférence. Ceci répondrait au désir que certaines des activités de l'Union puissent se dérouler dans différentes parties du monde, sans entraîner les grandes dépenses qu'occasionneraient des Conférences dans ces mêmes endroits.

Des avantages autres que d'ordre purement financier résulteraient de tels changements. La question d'un secrétariat est le souci constant des présidents des Sections et Commissions. Ce problème pourrait être résolu plus économiquement en renforçant le Secrétariat général de l'Union. Les réunions tenues dans la ville où le Secrétariat a son siège profiteraient ainsi de nombreux avantages, et tous les dossiers, etc., pourraient y être tenus à disposition.

Je réalise que des changements de cette nature représenteraient une rupture avec la tradition et devraient être examinés soigneusement avant qu'une décision soit prise. Mais, je crois qu'il est urgent de les étudier afin que s'ils semblent judicieux, ils puissent être adoptés lors de la Conférence de Londres en 1963.

Sir ALEXANDER TODD

ORDRE DU JOUR

des réunions du Bureau et du Conseil à Montréal
2–5 août 1961

1° Rapport statutaire du Président sur l'état général de l'Union
2° Adoption des Comptes Rendus de la XXe Conférence
3° Ratification de l'élection d'un Comité des Finances
4° Ratification de l'élection d'un Comité de Rédaction
5° Rapport biennal du Trésorier, commentaires du Comité des Finances
6° Siège de l'Union (voir chap. I, art. 1, § 5 des Statuts)
7° Proposition du Comité national britannique concernant la sauvegarde des intérêts de l'industrie chimique au sein de l'IUPAC
8° Organismes adhérents
  a) Adoption des nouveaux organismes adhérents éventuels
  b) Adoption du changement de catégorie de certains organismes adhérents
9° Adoption du budget provisoire pour 1962 et 1963
10° Limitation du nombre des membres titulaires dans les Divisions et Commissions
11° Ratification par le Bureau des décisions prises par le Comité exécutif
12° Ratification par le Conseil des décisions prises par le Bureau depuis la XXe Conférence
13° Adoption des rapports des Présidents de Section préalablement soumis par écrit au Bureau et au Conseil
14° Procès-verbaux des réunions des Présidents de Section – Londres, 1960–1961
15° Décision finale concernant la nouvelle Table des poids atomiques
16° Rapport du Comité ad hoc chargé de définir les fonctions des autorités de l'Union, des Sections, Divisions et Commissions (Président: Prof. VERKADE)
17° Problèmes concernant les publications et rapport de l'Editorial Board
18° Recommandations au sujet des unités fondamentales de mécanique – système M.K.S.A.-C.G.S.
19° Proposition concernant les règles provisoires de nomenclature (stéroïdes, abréviations, etc.)
20° Copyright et traduction
21° Règlement concernant l'élection et la durée du mandat des autorités de l'Union et des membres des Commissions
22° Problèmes concernant la Section de Chimie appliquée
23° Génie chimique
24° Coopération éventuelle avec l'OMS – «generic names»
25° Coopération éventuelle avec l'ISO
26° Rapport des Présidents de Section sur les résultats de la Conférence
27° Rapport du Comité des Finances
28° Election de trois membres du Bureau
  Ratification des élections faites par les Sections
29° Réunions prévues pour 1962 et 1963
30° Date et lieu de la XXIIe Conférence et du XIXe Congrès
31° Programme et sujets des futurs Congrès (voir résolution des Présidents de Section du 9 avril 1958)
32° Affiliation du Congrès de la Catalyse, du Congrès mondial du Pétrole, etc.
33° Divers

PROCÈS-VERBAL DES RÉUNIONS DU CONSEIL

tenues à Montréal du 2 au 5 août 1961

Présents: Le Président W.A. NOYES, jr, le Bureau et les délégués des Comités nationaux adhérents. Toutes les formalités ont été remplies pour permettre au Conseil de prendre des décisions. Les membres du Bureau ainsi que les Comités nationaux adhérents ont été priés, par la lettre nº 5001 du 16 mars 1961 du Secrétaire général, de soumettre leurs propositions pour l'ordre du jour. Les invitations à participer aux réunions du Conseil ont été envoyées par lettre recommandée quatre mois avant la Conférence, comme stipulé dans les statuts. Par la lettre nº 4996 du 15 mars 1961, les Membres adhérents et les Membres du Bureau ont été priés de proposer des candidats pour le nouveau Bureau. Egalement quatre mois avant la Conférence, le rapport du Président, le rapport du Trésorier ainsi que les rapports des vérificateurs ont été adressés en anglais et en français à tous les Pays membres, aux Membres du Bureau et aux délégués au Conseil afin qu'ils soient informés d'une manière détaillée des décisions prises depuis la Conférence de 1959.

Point 1 *Ordre du jour*

Le Prof. NOYES ouvre la séance en demandant au Conseil d'approuver une modification dans la suite des points de l'ordre du jour (selon requête du Bureau) afin de combler au début de la Conférence déjà la vacance créée par la démission du Prof. B.A. KASANSKI au Comité exécutif, au Bureau et au Comité de Rédaction.

Décide: d'approuver cette modification dans la suite des points de l'ordre du jour. (Approuvé à l'unanimité comme exigé par les statuts.)

Point 2 *Election du Prof. V.N. Kondratiev*

Décide: que le Prof. V.N. KONDRATIEV est élu au Comité exécutif, au Bureau et au Comité de Rédaction. (Approuvé à l'unanimité.)

Point 3 *Procédure d'élection*

Le Président demande au Conseil de décider quelle sera désormais la procédure à suivre pour les élections du Bureau.

Décide:

(i) de procéder à des élections séparées pour chaque poste à repourvoir: la délégation du Royaume-Uni fait remarquer que cette manière d'agir assure une juste répartition géographique des membres du Bureau;

(ii) que chaque pays ne devrait pas, en principe, être représenté par plus d'un membre au Bureau.

Point 4 *Rapport statutaire du Président sur la situation générale de l'Union*

Décide: d'accepter le «Rapport du Président sur la situation générale de l'Union».

Point 5 *Adoption des comptes rendus de la XXe Conférence*

Décide: d'approuver les comptes rendus de la XXe conférence.

Point 6 *Ratification de l'élection d'un Comité des Finances*

Décide: d'approuver l'élection d'un Comité des Finances comme suit:

Prof. J.C. Bailar (USA), mandant et président
Dr C.O. Gabrielson (Suède)
M. J. Givaudon (France)
Prof. O. Horn (Allemagne)
Prof. A. Nasini (Italie)
Dr O.A. Reutov (URSS)
Ce comité doit se réunir le jeudi 3 août afin de soumettre un rapport à la deuxième séance du Conseil.

Point 7 *Ratification de l'élection d'un Comité de Rédaction*

Décide: d'approuver l'élection d'un Comité de Rédaction comme suit:
Dr D.C. Martin, Président
Prof. P. Giguère
M. J. Givaudon
Prof. C.A. McDowell

Point 8 *Rapport biennal du Trésorier*

Décide: d'accepter avec remerciements le rapport biennal du Trésorier.

Point 9 *Siège de l'Union*

Selon les statuts, le siège de l'Union doit être fixé tous les quatre ans par le Conseil; il n'est pas stipulé d'une manière précise le temps pour lequel cette décision est valable. Le Président déclare que l'intention première est de fixer le siège pour une période de quatre ans. Aucune objection n'est formulée.
Décide: que l'Union continue à avoir son siège provisoire à Paris, conformément à l'art. 1 du chap. I des statuts.

Point 10 *Proposition du Comité national britannique de Chimie concernant les intérêts de l'industrie chimique*

Décide: en temps opportun, d'inclure dans les statuts une note stipulant l'intérêt de l'Union pour l'industrie chimique.

Point 11 *Organismes adhérents*

Aucun nouvel organisme ne demande à devenir membre de l'Union.

Décide: d'approuver le changement de catégorie des pays membres suivants:

Belgique de la catégorie B1 à la catégorie A1
Danemark de la catégorie B1 à la catégorie B2
Pay-Bas de la catégorie B à la catégorie A1

Point 12 *Adoption du budget provisoire pour 1962 et 1963*

Décide:

(i) d'approuver la recommandation faite par le Bureau de n'accorder des crédits en 1962 que pour des réunions de sections, divisions et commissions ayant lieu en Europe occidentale et en 1963 que pour des réunions de sections, divisions et commissions qui se tiendront à Londres.

Il n'y a que deux exceptions, à savoir: a) le Président de la Section de Chimie physique peut se rendre personnellement ou se faire représenter par une personne voyageant aux frais de l'IUPAC au Symposium sur la Spectroscopie moléculaire à Tokyo, en 1962; b) le Président de la Section de Chimie biologique peut se rendre personnellement ou se faire représenter par une personne voyageant aux frais de l'IUPAC au Congrès de Chimie clinique, à Détroit, en 1963;

(ii) à l'unanimité les taux suivants pour la cotisation annuelle minimale:

catégorie A1	2,600 dollars
catégorie A2	5,000 dollars
catégorie A3	10,000 dollars
catégorie B1	800 dollars
catégorie B2	1,600 dollars
catégorie C	450 dollars

Point 13 *Membres titulaires des Commissions*

Décide: de recommander de ramener de 10 à 8 le nombre des membres de chaque Commission étant entendu que le maximum statutaire de 10 reste inchangé, mais que le nombre normal des membres n'exédera pas 8 à moins de décision contraire du Comité exécutif de l'Union.

Point 14 *Ratification par le Conseil des décisions prises par le Bureau*

On a informé tous les organismes adhérents sur ces décisions.

Décide: de ratifier les décisions prises par le Bureau depuis la XXe conférence.

Point 15 *Adoption des rapports des Présidents de Section*

Contrairement aux statuts, mais à l'approbation unanime du Bureau et du Conseil, les Présidents de Section ne lisent pas leurs rapports au Conseil, étant donné que ceux-ci ont été remis sous forme imprimée, en anglais et en français, aux organismes adhérents et aux délégués nationaux. Cependant possibilité est donnée aux Présidents de Section de faire des remarques additionnelles s'ils le désirent.

Décide: d'approuver les six rapports de section.

Point 16 *Procès-verbaux des réunions des Présidents de Section – Londres 1960–1961*

Décide:

(i) de ratifier la décision du Comité exécutif d'organiser des réunions des Présidents de Section. Il émet le vœu que la périodicité annuelle de ces réunions soit maintenue;

(ii) d'approuver, dans leur principe, les deux résolutions suivantes. proposées par les Présidents de Section et de recommander leur adoption par les Sections: a) que les Présidents de Section soient autorisés à désigner leur secrétaire de Section; b) qu'un Président de Section ait rempli les fonctions de vice-président pendant deux ans avant d'assumer la présidence.

Point 17 *Formation d'une nouvelle Commission des Colloïdes et Chimie des Surfaces*

Lors de la réunion du Bureau, Sir ERIC RIDEAL a donné un aperçu détaillé de l'activité dans le domaine de la chimie des colloïdes et des surfaces. – Donnant suite à la recommandation du Bureau, le Conseil à l'unanimité *décide:*

(i) la création d'une Commission de Chimie des Colloïdes et des Surfaces.
La durée des travaux est fixée à 4 ans. Cette commission comptera 8 membres et sera rattachée à la Section de Chimie physique;

(ii) qu'actuellement aucune division de la Chimie des surfaces ne doit être rattachée à la Section de Chimie appliquée.

Point 18 *Décision finale concernant la nouvelle Table des poids atomiques relatifs*

Décide:

(i) d'adopter la nouvelle Table des poids atomiques relatifs, basée sur l'isotope 12 du carbone, comme proposé par la Commission des Poids atomiques de l'IUPAC;

(ii) d'assurer une large diffusion à cette nouvelle table des poids atomiques.

Point 19 *Rapport du Comité Verkade sur les charges des autorités de l'Union*

Décide:

(i) d'approuver le rapport du Comité ad hoc chargé de désigner les tâches des autorités de l'IUPAC, des Sections, Divisions et Commissions. Ce rapport, paru dans le Bulletin d'Information nº 14A, servira de base pour le fonctionnement futur de l'IUPAC;

(ii) d'approuver la résolution présentée par ce Comité selon laquelle le président et le secrétaire de chaque Section soient membres ex officio de toutes les divisions et commissions de la dite section.

Point 20 *Problèmes concernant les publications*

Décide:

(i) d'approuver la publication des «Règles concernant les abréviations et symboles de nomenclature chimique présentant un intérêt particulier en chimie biologique»;

(ii) d'approuver également l'accord convenu récemment avec la maison Butterworth qui permet la large diffusion de ces règles dans les revues appropriées de chimie et de biologie.

Point 21 *Système des unités M.K.S.A. – C.G.S.*

Décide: d'approuver la recommandation faite par la Section de Chimie physique concernant:

(i) l'emploi des coulombs, volts et autres unités qui en dérivent dans les problèmes électriques;

(ii) l'emploi des unités M.K.S.A. comme unités fondamentales dans les problèmes qui impliquent à la fois des ordres de grandeurs électriques et mécaniques.

Point 22 *Recommandations provisoires concernant la nomenclature des stéroïdes*

Décide: d'approuver les recommandations provisoires concernant la nomenclature des stéroïdes (imprimées comme appendice au Bulletin d'Information n° 11).

Point 23 *Règlement concernant l'élection et la durée de mandat des Autorités de l'Union et des membres des Commissions*

Décide:

(i) d'approuver la suggestion faite par le Comité exécutif selon laquelle les Sections sont invitées à appliquer la règle que les changements dans la composition des membres des Sections, Commissions et Divisions deviennent effectifs à la date de clôture d'une Conférence de l'Union;

(ii) d'approuver la création d'un Comité ad hoc qui, sous la présidence du Prof. P. E. VERKADE est chargé d'examiner la structure de l'Union et d'élaborer toutes propositions pour sa révision et le changement des statuts. Le rapport de ce Comité devra être présenté avant la prochaine conférence de l'Union.

Point 24 *Problèmes concernant la Section de Chimie appliquée*

Décide: d'approuver la structure de la Section de Chimie appliquée de l'IUPAC telle qu'elle a été proposée dans le rapport de la Section au Conseil.

Point 25 *Symboles pour les énergies d'Helmholtz et de Gibbs*

Décide: d'approuver la recommandation faite par la Section de Chimie physique, à savoir que, dans la mesure du possible, le symbole «F» ne doit plus être utilisé pour les énergies d'Helmholtz ou de Gibbs; la lettre «A» doit désigner l'énergie d'Helmholtz et la lettre «G» l'énergie libre de Gibbs; la lettre «F» sera réservée aux cas tout à fait exceptionnels. En conséquence, le Manuel des symboles et de nomenclature physico-chimique (Londres 1959) doit être modifié comme suit aux pages 14 et 15:

309	Energie d'Helmholtz	(Gibbs ψ = E–TS)	A
311	Energie de Gibbs	(Gibbs ζ = H–TS)	G

Point 26 *Génie chimique*

A la réunion du Bureau, le Dr D. BEHRENS de la Fédération européenne du Génie chimique a donné un rapport détaillé sur l'activité de l'organisation et, suivant la proposition du Bureau, le Conseil

décide: d'accepter l'affiliation de la Fédération européenne du Génie chimique et de chercher à obtenir des accords similaires avec d'autres organisations de ce genre en Amérique, Russie et Asie.

Point 27 *Coopération avec l'Organisation Mondiale de la Santé – «Generic Names»*

Décide:

(i) que le Secrétaire général doit garder contact avec l'Organisation Mondiale de la Santé afin de sauvegarder les intérêts de la chimie;

(ii) qu'il doit faire des propositions adéquates au Comité exécutif concernant toute intervention jugée nécessaire.

Point 28 *Coopération avec l'Organisation Internationale de Normalisation*
Un rapport de la Commission judiciaire concernant les abréviations de l'Union internationale des Sciences biologiques a donné matière à nombreuses discussions à la réunion du Bureau, notamment, la recommandation 2 de ce rapport conçue comme suit:

«Dans le choix d'abréviations, la normalisation internationale (ISO) ou la normalisation nationale correspondante l'emporte sur les propositions émanant d'organismes scientifiques internationaux qui devraient à leur tour l'emporter sur d'autres codes. Les éditeurs des revues doivent garder contact avec les organismes compétents pour s'assurer que les abréviations admises soient diffusées et employées.

Décide: que le Secrétaire général doit faire les démarches nécessaires auprès de l'Organisation Internationale de Normalisation et du Comité exécutif de l'ICSU.

Point 29 *Rapport du Comité ad hoc des Finances*
Décide: de ratifier le rapport du Comité ad hoc des Finances et d'approuver les recommandations suivantes:

1° Le Bureau de l'IUPAC est autorisé à engager des dépenses relatives aux frais de voyage et de séjour qu'entraîne la participation aux Conférences de l'IUPAC d'un délégué de chacun des organismes adhérents qui n'a pas de représentant aux commissions, ni aux divisions, ni aux comités de l'IUPAC.

2° Selon une suggestion faite par Sir Alexander Todd et recommandée par le Bureau, les conférences de l'IUPAC doivent être organisées de manière à limiter les frais. Il n'est pas nécessaire qu'elles aient lieu conjointement à des congrès. Cela laisserait sousentendre que ces conférences soient toujours tenues en Europe occidentale, et si possible dans la même ville. Des colloques et symposia peuvent être associés à ces conférences pour en rehausser l'intérêt scientifique.

3° Le Bureau de l'IUPAC est autorisé à décider si, à l'occasion de chaque conférence des avions spéciaux doivent être affrétés. Cas échéant, le choix est offert aux membres titulaires entre le vol en avion spécial ou le remboursement du montant correspondant à une place dans cet avion.

4° Demander aux organismes adhérents d'assumer, chaque fois que possible, les frais de voyage et de séjour de leurs membres titulaires. De tels paiements seront considérés comme contributions à l'IUPAC.

5° Qu'une (peut-être deux ou trois) personne soit désignée dans chaque pays pour étudier de façon bénévole les moyens les plus efficaces de trouver des fonds dans ce pays et mettre ces plans à exécution.

6° A l'occasion, les fonds de l'IUPAC actuellement investis dans des titres d'Etat et les autres fonds à placer doivent être investis en papiers valeur de compagnies sûres se rattachant au domaine de la chimie.

Point 30 *Election de 4 membres du Bureau*

Toutes les mesures ont été prises à l'avance pour assurer des élections en règle. Une lettre datée du 15 mars 1961, par laquelle on demandait des propositions pour le Bureau, ainsi qu'une courte biographie des candidats, a été adressée à tous les organismes adhérents. Le mode d'élection fait l'objet d'un point précédent de l'ordre du jour (voir point 3).

1° Le Prof. A. TOURKY est élu pour deux ans (1961–63) à la place du Prof. LORA-TAMAYO. Répartition des voix:
104 oui
16 non

2° Le Prof. GOVINDACHARI est élu pour quatre ans (1961–1965) à la place du Prof. MIZUSHIMA. Répartition des voix:

1er tour	Prof. GOVINDACHARI	46 voix
	Prof. UZUMASA	42 voix
	Dr A.L.G. REES	28 voix
2e tour	Prof. GOVINDACHARI	68 voix
	Prof. UZUMASA	50 voix

3° Le Prof. C. WICHTERLE est élu pour quatre ans (1961–1965) à la place du Prof. URBANSKI. Répartition des voix:

Prof. WICHTERLE	64 voix
Prof. SCHAY	44 voix
Prof. TRZEBIATOWSKI	12 voix

4° Le Dr C.E. NABUCO DE ARAUJO jr. est élu pour quatre ans (1961–1965) à la place du Dr WICHERS. Répartition des voix:
72 oui
48 non

Point 31 *Réunions prévues pour 1962, 1963 et 1964*

Décide: d'approuver les prochains congrès suivants:

Juin 1962	Réunion du Bureau	Bruxelles
11–14 juin 1962	75e anniversaire de la Société chimique de Belgique	Bruxelles
25–29 juin 1962	International Conference on Co-ordination Chemistry	Stockholm
27 août–2 sept. 1962	Symposium sur la chimie des produits naturels	Prague
10–15 sept. 1962	Symposium sur la structure moléculaire et la spectroscopie	Tokyo
17–19 sept. 1962	Symposium international de chimie pharmaceutique	Florence
5–9 juillet 1963	XXIIe conférence de l'IUPAC	Londres
10–17 juillet 1963	XIXe Congrès international de Chimie pure et appliquée	Londres
20–25 juillet 1964	3e Congrès international sur la catalyse	Amsterdam
4–10 août 1964	5e Symposium international sur la Radio-activité des solides	Munich
Septembre 1964	Symposium sur les Produits naturels	Japon

Point 32 *Sujets des prochains congrès*

Décide: que le prochain congrès de l'IUPAC devrait être consacré à la chimie organique tout en réservant une grande part à la chimie biologique; la chimie analytique et la chimie appliquée ne devraient pas être oubliées.

Point 33 *Affiliation du Congrès international sur la Catalyse*

Décide: d'affilier à l'IUPAC le Congrès international sur la Catalyse.

Point 34 *Remerciements*

Décide: de remercier vivement nos hôtes canadiens de leur invitation et de toute la peine qu'ils se sont donnée pour assurer la réussite de la Conférence.

PROCÈS-VERBAL DES RÉUNIONS DU BUREAU

tenues à Montréal du 2 au 5 août 1961

Présents

Prof. W.A. Noyes, jr, Président
Prof. G. Chaudron
Prof. W. Klemm
Sir Alexander Todd
Prof. R. Belcher
Dr J.H. Bushill
Prof. H.J. Emeléus
Prof. H. Erdtman
Prof. E.J. King
Prof. W. Kuhn
Prof. V.N. Kondratiev
Prof. M. Letort
Prof. S. Mizushima
Prof. T. Urbanski
Prof. P.E. Verkade
Dr. E. Wichers
Dr. R. Morf, Secrétaire général
Sir Charles Dodds, Trésorier

Excusés

Prof. M. Lora-Tamayo
Prof. D. Marotta
Prof. A. Stoll
Prof. A. Tiselius

Membres du Bureau nouvellement élus, également présents le 5 août 1961:

Prof. H. Malissa
Prof. G.-M. Schwab
Prof. R. Tourky
Prof. O. Wichterle

Introduction

La plupart des sujets discutés à la réunion du Bureau à Montréal ont également été traités à la réunion du Conseil et ont été verbalisés en tant que décisions du Conseil (voir procès-verbaux des réunions du Conseil). Par manque de temps, certains problèmes, principalement ceux concernant la Section de Chimie appliquée, ont été débattus par le Bureau mais non par le Conseil. Ces quelques questions sont rapportées ci-après:

Point 1 *Ordre du jour*

Décide: d'approuver l'ordre du jour proposé par le Secrétaire général avant la réunion.

Point 2 *Comité Verkade*

Une longue discussion s'est déroulée lors de la réunion du Bureau concernant la tâche du nouveau Comité Verkade (dont la création a été approuvée par le Conseil – voir point 23, Réunions du Conseil, 1961).

Décide: que ce Comité doit étudier la structure future de l'IUPAC, la procédure des élections ainsi que les changements à opérer aux statuts.

Point 3 *Procédure d'élection*

Décide: qu'une procédure d'élection dans les Sections et Commissions devrait être également étudiée d'une manière approfondie.

Point 4 *Répartition géographique*

Décide: de fixer clairement la procédure à suivre pour assurer une répartition géographique appropriée chaque fois qu'une telle

répartition serait souhaitable au sein de l'IUPAC. En principe, chaque organisme scientifique, telles les Divisions et Commissions, devrait être composé d'experts scientifiques. En revanche, les membres des organismes administratifs, tels le Conseil, les Comités de Section, le Bureau, etc., devraient représenter toutes les parties du monde ainsi que les différentes branches de la chimie – pure, appliquée et industrielle.

Point 5 *Commission des Additifs alimentaires*

La Commission des Additifs alimentaires a demandé l'autorisation de porter l'effectif de ses membres de 4 à 6 par l'admission d'un membre provenant d'Europe et, éventuellement, d'un membre provenant d'Amérique du Sud.

Décide:

(i) d'autoriser la Commission des Additifs alimentaires de porter l'effectif de ses membres à 6;

(ii) d'autoriser cette Commission à organiser une réunion en Europe occidentale, en 1962.

Point 6 *Formation d'une Commission mixte au sein de la Section de Chimie appliquée*

La Division des Eaux d'Egoût et Eaux industrielles résiduaires a demandé l'autorisation de former une Commission mixte pour étudier l'utilisation et le traitement de déchets organiques par des méthodes biologiques. La création de cette Commission n'exigerait pas la nomination de nouveaux membres titulaires.

Décide: d'approuver la création d'une Commission mixte dans le but proposé.

Point 7 *Formation d'une Commission pour l'Analyse du Papier*

La Division de la Pâte, du Papier et du Carton avait demandé en son temps l'autorisation de former une Commission pour l'Analyse du Papier.

Décide: d'approuver la formation d'une Commission pour l'Analyse du Papier.

Point 8 *Patronage*

La Division de Toxicologie et d'Hygiène industrielle a été invitée à se réunir en commission mixte avec le «Permanent International Committee on Occupational Health» à Paris ou à Zurich, en 1962. Le patronage de l'IUPAC, sans soutien financier, a été demandé.

Décide: d'accorder le patronage de l'IUPAC à cette réunion.

Point 9 *Division des Revêtements de Surface*

Cette Division a demandé l'autorisation de se réunir en 1962.
Décide: d'autoriser la Division des Revêtements de Surface de se réunir en 1962 en Europe occidentale.

Point 10 *Division de Fermentation*

Cette Commission avait été priée en son temps de reporter sa réunion de 1961 en 1962.

Décide: de confirmer que cette Commission est autorisée à se réunir en Europe occidentale en 1962.

ORDRE DU JOUR

des réunions du Comité exécutif à Montréal
31 juillet, 1er et 5 août 1961

101° Forme juridique de l'IUPAC
102° Démission de la Secrétaire de la Commission de Nomenclature analytique
103° Problèmes de la Section de Chimie appliquée
a) Formation d'une Division de Chimie des Surfaces
b) Division des Matières grasses
c) Division des Plastiques et Produits de haute Polymérisation
104° Problèmes de publication – Royautés
105° Subvention de l'Unesco
106° Comité de coordination entre IUB/IUPAC
107° Réorganisation de l'ICSU
108° Coopération avec l'Unesco – Enquête concernant l'enseignement de la chimie
109° Représentation de l'IUPAC auprès du Comité spécial pour les Recherches antarctiques (SCAR)
110° Nomination d'une commission de liaison entre les unions intéressées à la géochimie
111° Représentation de l'IUPAC auprès du Comité d'Experts Conseils pour le Transport de Marchandises dangereuses

PROCÈS-VERBAL DE LA 47e RÉUNION DU COMITÉ EXÉCUTIF

tenue à Montréal le 31 juillet, les 1er et 5 août 1961

Présents
Prof. W. ALBERT NOYES, jr, Président
Sir CHARLES DODDS, Trésorier
Prof. N.V. KONDRATIEV
Prof. WILHELM KLEMM
Prof. MAURICE LETORT
Dr RUDOLF MORF, Secrétaire général
Sir ALEXANDER TODD

Introduction et information générale

Selon la tradition et conformément aux statuts de l'Union, le Comité exécutif et le Bureau doivent également passer en revue l'ordre du jour de la Réunion du Conseil. Cette manière de procéder est compliquée et prend beaucoup de temps. Afin d'éviter d'inutiles répétitions, il est suggéré que les sujets qui doivent finalement être soumis au Conseil soient verbalisés en tant que décisions du Conseil seulement.

Pour cette raison, ce procès-verbal se limite aux questions traitées par le Comité exécutif seul. Le procès-verbal de la réunion du Bureau se restreindra aux affaires, peu nombreuses, qui ont été discutées par celui-ci.

Point 136 *Ordre du jour*

Décide: d'approuver l'ordre du jour proposé par le Secrétaire général avant la réunion.

Point 137 *Procès-verbal de la 46e Réunion*

Le procès-verbal de la 46e réunion du Comité exécutif à Bâle est considéré comme lu, approuvé et signé.

Point 138 *Forme juridique de l'IUPAC*

Un appendice au procès-verbal de la réunion de Bâle contient une note de M. PETITPIERRE relevant les avantages et désavantages de conférer à l'Union une personnalité juridique.
Les activités de l'Union impliquent parfois des risques financiers pour les personnes responsables. Il faut en tenir compte si l'on confère un statut juridique à l'IUPAC. Toutefois, il ne faut pas omettre que le lieu de résidence du siège de l'Union peut influencer le taux des impôts.

Décide:

(i) de différer la décision jusqu'à ce que les membres de la réunion aient eu le temps de lire le procès-verbal de la dernière réunion;

(ii) que le Comité exécutif devra procéder à des consultations juridiques.

Le Secrétaire général prend acte.

Point 139 *Démission de la Secrétaire de la Commission de Nomenclature analytique*

Une lettre de démission de Mlle A.M.G. MACDONALD donna lieu à une discussion approfondie.

Décide: d'adresser une recommandation provisoire au Comité de la Section de Chimie analytique stipulant qu'une suspension pour une période de deux ans de l'activité de la Commission de Nomenclature analytique paraîtrait judicieuse. Etant donné que la nomenclature analytique doit aller de pair avec les activités des autres sections, le problème entier devrait être considéré lors de la prochaine réunion des Présidents de Section.

Point 140 *Division des Matières grasses de la Section de Chimie appliquée*

Décide:

(i) sans créer un précédent, de rembourser les frais encourus par les membres de cette Division pour participer aux réunions de Bari et de Londres;

(ii) de n'allouer aucune subvention à cette Division en 1962;

(iii) de ne reconnaître à l'avenir que les dépenses qui ont été approuvées au préalable par le Trésorier.

Point 141 *Méthodes standard pour l'analyse des matières grasses*

Décide: de soumettre au Comité consultatif d'Edition les recommandations concernant des méthodes standard pour l'analyse des matières grasses, afin d'obtenir une publication rapide.

Point 142 *Division des Plastiques et Produits de haute Polymérisation, patronage*

A sa réunion, quelques jours avant celle du Comité exécutif, la Commission de Chimie macromoléculaire a décidé de réduire ses symposia au rythme de un tous les deux ans au lieu de un par année. Le prochain symposium aura lieu à Paris en 1963 à une date aussi rapprochée que possible de la Conférence Internationale et du Congrès de Londres.

Etant donné les dates choisies pour le Symposium sur la Chimie macromoléculaire et celui sur les Produits de haute Polymérisation, les délégués qui désiraient participer à ces deux manifestations durent rester huit jours au Canada. Ce fait fit l'objet de nombreux commentaires.

La Société de Chimie industrielle de Paris a projeté d'organiser en 1962 un symposium et une exposition sur les plastiques et produits de haute polymérisation. Le Prof. LETORT a suggéré de demander le patronage de l'Union.

Décide:

(i) d'accorder à ce symposium le patronage de l'IUPAC demandé par la Division des Plastiques et Produits de haute Polymérisation;

(ii) que l'IUPAC ne se chargera pas de la publication des comptes rendus de ce symposium.

Point 143 *Problèmes de publication*

Avant la réunion du Comité de Rédaction, on procéda à une étude de l'ensemble des publications.

Décide: de demander à MM. Butterworths

(i) un rapport indiquant le nombre de publications imprimées, l'état des ventes et donnant un aperçu de la situation financière pour toutes les publications (en particulier les rapports de nomenclature) parues sous l'ancien contrat;

(ii) un rapport annuel avec les mêmes données concernant le journal «Chimie Pure et Appliquée».

Point 144 *Subvention de l'Unesco*

L'ICSU n'a accordé aucune subvention pour des publications de l'IUPAC bien qu'une demande justifiée munie d'un décompte détaillé et minutieux ait été soumise à cette organisation par le Secrétaire général.

Décide:

(i) que les représentants de l'IUPAC auprès de l'ICSU devront s'enquérir de la raison pour laquelle cette subvention n'a pas été attribuée;

(ii) de prier l'ICSU de réviser sa décision à ce sujet.

Point 145 *Comité de coordination entre IUB/IUPAC*

A côté des problèmes concernant l'organisation et la coordinations des activités futures des deux unions, il aurait été possible de surmonter facilement les difficultés causées par la publication des «Règles provisoires des abréviations et symboles de nomenclature chimique présentant un intérêt particulier en Chimie biologique», si le Comité de coordination était intervenu rapidement.

Un télégramme signé par le Trésorier et le Secrétaire général demandant l'approbation de ces règles a été envoyé à l'Union internationale de Biochimie. Une réponse n'est pas encore parvenue.

La Commission de Nomenclature biologique décida, à la majorité des voix, de se transformer en commission mixte dans laquelle les deux unions seraient représentées.

Décide:

(i) d'approuver cette dernière proposition;

(ii) de ne payer les frais de voyage et de séjour qu'aux délégués de l'IUPAC à cette commission mixte.

Point 146 *Coopération avec l'Unesco – Enquête concernant l'enseignement de la chimie*

Décide: que le Secrétaire général doit continuer de coopérer avec l'Unesco et doit étudier toute possibilité de coopération entre l'Unesco et l'IUPAC.

Point 147 *Coopération avec l'Unesco – Échange d'informations dans le domaine de la catalyse théorique*

Décide: que le Prof. SCHWAB, Président de la Section de Chimie physique, doit examiner cette question. Il doit faire des propositions au Comité exécutif en collaboration étroite avec le Prof. FARKAS.

Le Prof. SCHWAB prend acte.

Point 148 *Représentation de l'IUPAC auprès du Comité spécial pour les Recherches antarctiques (SCAR)*

Décide: de demander au Dr PANTIN de participer à la réunion du Comité spécial pour les Recherches antarctiques qui aura lieu en Nouvelle-Zélande; de lui rembourser ses frais de voyage et de séjour en Nouvelle-Zélande.

Le Secrétaire général prend acte.

Point 149 *Nomination d'une Commission de Liaison entre les unions intéressées à la géochimie*

Décide: que le Prof. KLEMM doit discuter la question avec le Président de la Section de Chimie inorganique. Dans la mesure du possible, le Bureau ou les Présidents des Sections doivent soumettre des recommandations à ce sujet.

Point 150 *Représentation de l'IUPAC auprès du Comité d'Experts-Conseils pour le transport de Marchandises dangereuses*

Décide: que le Secrétaire général doit prendre contact avec ce Comité des Nations-Unies à Genève.
Le Secrétaire général prend acte.

Point 151 *Distribution d'exemplaires gratuits du journal «Chimie Pure et Appliquée»*

Donnant suite aux conseils du Comité de Rédaction, il est *décidé:* de distribuer comme suit les 100 exemplaires gratuits du journal «Chimie Pure et Appliquée» envoyés au Secrétaire général:
Une copie à chaque: membre du Comité de rédaction, membre du Comité exécutif, Organisme adhérent, Président de Section.

Point 152 *Distribution de tirages à part aux auteurs*
Décide:

(i) de ne remettre gratuitement que 25 tirages à part aux auteurs d'articles publiés dans notre Journal;

(ii) de répartir ces 25 exemplaires entre les auteurs s'ils sont plusieurs;

(iii) s'il s'agit d'un rapport de Commission, de remettre ces 25 exemplaires au Président de la Section correspondante pour qu'il en fasse la distribution.

Point 153 *Budget*
Décide:

(i) de soumettre un budget détaillé au Comité exécutif à Rome;

(ii) que le Président de la Section de Chimie physique peut se rendre personnellement ou se faire représenter par une personne voyageant aux frais de l'IUPAC au Symposium sur la Spectroscopie moléculaire à Tokyo, en 1962;

(iii) que le Président de la Section de Chimie biologique peut se rendre personnellement ou se faire représenter par une personne voyageant aux frais de l'IUPAC au Congrès de Chimie clinique à Détroit, en 1963;

(iv) que les frais du Président, du Trésorier et du Secrétaire général, qui sont assumés par des tiers, doivent figurer aux comptes comme dépenses et être contre-balancés aux recettes comme dons;

(v) que la Commission de Spectroscopie moléculaire, qui a demandé l'autorisation de compter neuf membres, doit se limiter à huit.

Point 154 *Réunion des Présidents de Section*

Décide: que la prochaine réunion des Présidents de Section sera convoquée par le Prof. EMELÉUS.
Le Prof. EMELÉUS prend acte.

Point 155 *Nouveaux membres du Bureau*

Décide: que les nouveaux membres du Bureau nommés à Montréal ne recevront pas d'indemnité pour leurs frais de voyage et de séjour dans cette ville, sauf s'ils y avaient droit avant leur nomination.

Point 156 *Tâches et prérogatives du Comité chargé de réviser les statuts de l'Union, Président: Prof. P.E. Verkade*

Décide:

(i) d'inviter le Prof. Verkade à participer à la réunion du Comité exécutif à Rome;

(ii) d'inviter chaque membre du Comité exécutif avant la réunion à soumettre ses idées sur la nouvelle structure de l'Union. Cela permettra au Comité exécutif de fixer les tâches et prérogatives du Comité mentionné ci-dessus lors de sa réunion à Rome. A cet effet, il convient d'observer les directives suivantes:

a) Plus d'autonomie aux Sections et un plus grand appui de la part du secrétariat. Toutefois, si des secrétaires permanents doivent être engagés pour les sections, leur lieu de travail devrait être le même que celui du Secrétaire général, afin d'éviter que les mêmes questions ne soient traitées deux fois et d'assurer une coopération étroite;

b) tôt ou tard, il sera indispensable de nommer un Secrétaire général permanent et mention doit être faite à ce sujet dans les statuts;

c) une attention particulière doit être vouée aux propositions de Sir Alexander Todd;

d) élaborer un règlement interne pour la procédure des élections tant pour les Sections, Divisions et Commissions que pour le Bureau;

e) tenir compte de la suggestion visant à créer une nouvelle section chargée de veiller aux intérêts de l'industrie chimique.

Point 157 *Prochaine réunion*

Décide: que la prochaine réunion du Comité exécutif aura lieu à Rome du 7 au 9 novembre 1961.

W.A. Noyes, Jr
Rudolf Morf

I. SECTION DE CHIMIE PHYSIQUE

RAPPORT SUR LES ACTIVITÉS

d'août 1959 à mai 1961

Comité de Section et Section en général

La dernière réunion de la Section a eu lieu à Munich en 1959, et la prochaine réunion aura lieu à Montréal en 1961.

Le Président a pris part à une réunion du Bureau à Leningrad en mai 1960, à une réunion du Comité exécutif à Bâle en avril 1961 et à une réunion des six Présidents de Section à Londres en octobre 1960, où furent discutés les problèmes généraux de l'Union, la coordination de ses activités, l'organisation des congrès, les problèmes de publication.

Une prochaine réunion des Présidents de Section, préparatoire à la conférence de Montréal, aura lieu en juin. De plus, le Président a assisté au symposium de la Commission de Spectroscopie moléculaire à Bologne (du 7 au 12 septembre 1959) et à la réunion sur les macromolécules à Wiesbaden (du 12 au 17 octobre 1959).

Il a également représenté l'IUPAC à la réunion de la Deutsche Bunsen-Gesellschaft à Karlsruhe (mai 1961). Le Prof. W. KLEMM a représenté l'Union à la célébration du centenaire BUNSEN-KIRCHHOFF, qui eut lieu à Heidelberg en mai 1960 sous les auspices de la Deutsche Bunsen-Gesellschaft, de l'Académie de Heidelberg et de l'Université de Heidelberg, sous le patronage de l'IUPAC.

Le Prof. JOST, Président de la Commission des Symboles et de Terminologie, fut délégué à une réunion de l'ISO (International Standard Organization) à Copenhague en juin 1960; cette délégation était nécessaire, une partie des recommandations de l'ISO concernant directement l'IUPAC.

D'une façon analogue, le Prof. D. WICHTERLE, de Prague, et le Dr KLINE assistèrent partiellement en octobre 1960 à Prague, à une réunion de l'ISO/TC11 concernant les plastiques, et le Dr D.C. MARTIN, de Londres, assista à l'Assemblée générale de l'Union scientifique internationale de Radio (URSI) à Londres en septembre 1960. Le Prof. E. MIESCHER (Bâle) a représenté l'Union à la réunion du COSPAR (Commission des Recherches spatiales).

ACTIVITÉS DES COMMISSION

I.1 Commission des Symboles et de Terminologie physico-chimiques

(Président: Prof. W. JOST)

Le Prof. GUERASSIMOV communique que le manuel de symboles et de terminologie physico-chimiques, qui a été publié en anglais et en français par BUTTERWORTHS en août 1959, va être traduit en langue russe.

Un rapport sur la standardisation du pH et de la terminologie connexe, préparé par R.G. BATES et E.A. GUGGENHEIM, a été publié à titre préliminaire dans le vol. 1 du journal de l'IUPAC: «Pure and Applied Chemistry».

Les systèmes d'unités CGS et MKSA d'une part, et les symboles de certaines fonctions thermodynamiques, en particulier les symboles représentant l'énergie libre de HELMHOLTZ et de GIBBS, sont deux sujets parmi les plus importants. Il y a une grande probabilité d'accord dans les deux cas. Le programme des autres activités inclut l'établissement de la définition de grandeurs physico-chimiques, constituant un supplément aux symboles recommandés dans le manuel.

I.2 Commission de Thermodynamique chimique

(Président: Prof. F.D. Rossini)

La Commission continue la publication de son «Bulletin de Thermodynamique chimique», qui a fait l'objet de nombreuses demandes de la part de personnes travaillant dans ce domaine.

La Sous-Commission de Thermochimie expérimentale a terminé la préparation du volume II sur la Thermochimie expérimentale, dont l'édition est dirigée par le Dr H.A. Skinner.

La Sous-Commission de Thermodynamique expérimentale travaille au projet du volume 1 concernant «La Thermodynamique et la Calorimétrie expérimentales des Systèmes non réagissants», dont l'édition est dirigée par le Dr J.P. McCullough.

Les comptes rendus du symposium de Wattens sur la Thermodynamique (août 1959) seront publiés dans le volume 2 du journal de l'IUPAC: «Pure and Applied Chemistry», en juin 1961.

La Commission a recommandé l'adoption d'une résolution sur la publication de données calorimétriques et thermodynamiques acceptées par la Conférence sur la Calorimétrie lors de sa réunion de Gathinburg (Tennessee) en septembre 1959. Cette proposition, ayant été approuvée à la fois par le Bureau de la Section de Chimie physique, par le Comité exécutif et par le Bureau de l'IUPAC, sera publiée dans le «Journal of Pure and Applied Chemistry».

La Commission principale et les Sous-Commissions vont tenir des réunions à Montréal; la Sous-Commission de Thermochimie expérimentale collaborera à la Conférence sur la Calorimétrie, qui se tiendra à Ottawa du 14 au 17 août, immédiatement après le Congrès de Montréal. La Sous-Commission de Thermodynamique expérimentale va collaborer avec la Commission de l'IUPAC sur les Hautes Températures en patronnant le symposium sur la Thermodynamique des Hautes Températures dans le cadre du Congrès de Montréal du 7 au 11 août.

Modifications apportées au nom et à l'organisation de la Commission

Sous réserve de l'accord final par le Bureau et le Conseil de l'IUPAC, le nom et l'organisation cités ci-après seront effectivement attribués à la Commission dès la clôture de la Conférence de l'IUPAC 1961 à Montréal.

L'organisme actuel, consistant en une Commission principale et deux Sous-Commissions, sera remplacé par *une* Commission dont le nom deviendra «Commission de Thermodynamique et de Thermochimie». Le travail des Commission principale et Sous-Commissions actuelles sera effectué par des sous-comités spéciaux, qui comprendront des membres associés et des représentants nationaux, aussi bien que des membres titulaires.

Les plans de travail futur comprennent, outre les publications mentionnées, des discussions englobant l'échelle des températures, les valeurs des constantes fondamentales, les symboles et noms pour les fonctions et propriétés thermodynamiques, l'organisation de symposia (le prochain probablement en 1963) et la compilation de propriétés thermodynamiques et, par la suite, de propriétés de transport de gaz et de mélanges gazeux.

I.3 Commission d'Electrochimie

(Président: Dr M. Pourbaix)

Un symposium a eu lieu à Vienne (du 29 septembre au 2 octobre 1959), dans le cadre de la 11e Réunion du CITCE (affilié à l'IUPAC).

Les Sous-Commissions des Données électrochimiques et des Symboles et

Terminologie électrochimiques de la Commission d'Electrochimie ont tenu des réunions conjointes à Bruxelles du 29 août au 3 septembre 1960 avec les Commissions du CITCE nº 1 (Diagrammes tension pH), nº 2 (Nomenclature et Définitions électrochimiques) et nº 5 (Corrosion). D'autres réunions conjointes de ces Sous-Commissions avec des Commissions du CITCE ont eu lieu à Bruxelles au cours de la 12e Réunion du CITCE du 24 au 29 avril 1961.

La Commission d'Electrochimie tiendra sa prochaine réunion en relation avec la 13e Réunion du CITCE pendant la Conférence et le Congrès de Montréal. Une réunion conjointe avec la Commission des Données électrochimiques de la Section de Chimie analytique est projetée à cette occasion.

La Commission d'Electrochimie prendra part au programme du Congrès, particulièrement dans le cas des colloques sur les sels fondus et sur la Cinétique des Processus d'Electrodes.

Un rapport sur la nomenclature et les définitions électrochimiques, élaboré par P. Van Rysselberghe et préparé par la Commission du CITCE «Nomenclature et Définitions électrochimiques» et la Sous-Commission de l'IUPAC «Symboles et Terminologie électrochimiques», va être complété et soumis à l'IUPAC pour publication à la fin de la Conférence de Montréal.

De plus, W.J. Hamer complète actuellement le rapport technique RT87 «Enthalpies libres de formation standard» (CEBELCOR, juin 1960), qui sera soumis à l'IUPAC pour publication.

Une version française de l'«Atlas d'Equilibres électrochimiques» paraîtra dans quelques semaines, et on espère publier une version anglaise du même Atlas pendant l'été 1961.

I.4 Commission des Macromolécules

(Président: Sir H.W. Melville)

La Commission s'est réunie les 12 et 13 octobre 1959 à Wiesbaden et les 15 et 17 juin 1960 à Moscou. Ces réunions se sont tenues en relation avec des symposia qui avaient été organisés en collaboration par la Commission et la Nation invitante.

Les matières discutées et les actions entreprises sont énumérées ci-dessous:

1º Nomenclature: Etant donné le grand nombre de polymères actuellement synthétisés, le problème de la nomenclature est devenu extrêmement compliqué, et des démarches préliminaires ont été effectuées pour essayer d'établir et d'achever la standardisation qui permettrait d'éviter la confusion dans la littérature.

a) Langue allemande: Après des années de discussions on a abouti à un accord final et les recommandations ont été publiées dans «Die Makromolekulare Chemie», *38*, pages 1–12 (1960).

b) Langue russe: Le système de nomenclature utilisé au Symposium de Moscou sera officiellement proposé à la réunion de Montréal, et il est à prévoir qu'il sera accepté. Des arrangements seront pris pour publication.

c) Langue japonaise: On prépare actuellement un rapport sur la nomenclature.

d) Polymères stéréo-spécifiques: La synthèse des polymères stéréo-spécifiques a créé de difficiles problèmes de nomenclature. Un comité spécial a été créé sous la direction du Dr M.L. Huggins dans le but de préparer un rapport en anglais sur cette question pour la prochaine réunion de la Commission. Un rapport préliminaire destiné uniquement à la discussion a été publié dans le «Journal of Polymer Science», de manière à mettre les chimistes spécialistes des hauts polymères en mesure d'envoyer à la Commission des suggestions utiles.

2° *Standardisation des poids moléculaires:* Une expérience internationale précédente faite par la Commission concernant la standardisation des poids moléculaires n'a pas été entièrement satisfaisante, en partie par suite de la difficulté présentée par la préparation de polymères comportant une gamme restreinte de poids moléculaires. Maintenant que l'on dispose de méthodes permettant la préparation de tels polymères, un autre programme international a été entamé. Des échantillons de polystyrène, préparés dans des conditions soigneusement contrôlées, ont été distribués à l'échelle mondiale, à des laboratoires sélectionnés. Des mesures utilisant la pression osmotique sont actuellement en cours. On espère avoir les résultats préliminaires pour la réunion de Montréal.

3° *Liaison avec la Division des Plastiques et des Hauts Polymères de l'IUPAC:* Dans le but de fournir la collaboration nécessaire et d'éviter un chevauchement des activités, il a été décidé que:

a) l'agenda, les minutes des réunions et les programmes seraient échangés;

b) des représentants de chaque Commission seraient désignés pour assister à chaque réunion extérieure à leur Commission.

4° *Réunions:* La prochaine réunion aura lieu à Montréal à la fin de juillet 1961. Il n'est pas prévu d'autres réunions jusqu'à la fin de 1963. Il y a deux possibilités, l'une en France, l'autre en Inde. Le Japon a également manifesté son intérêt à être désigné pour une des réunions futures.

I.5 Commission des Données et Etalons physico-chimiques

(Président: Dr E. Wichers)

En accord avec une recommandation faite à la clôture du symposium sur le Contrôle de la Pureté par Analyse thermique, tenu à Amsterdam en avril 1957, quatre préparations faites par le United States Bureau of Standards, ont été envoyées pour étude cryométrique à 19 laboratoires sélectionnés d'Europe et des USA. Dans l'intervalle, tout le travail expérimental a été complété, les résultats analysés et un rapport présenté aux participants.

Sur cette base, on rédigera et on discutera, lors d'un symposium organisé pour le 18 août 1961 pendant les Journées de Clôture de la Conférence sur la Calorimétrie à Ottawa, les conclusions relatives au mode d'application de l'analyse thermique à l'évaluation du degré de pureté.

La Commission a également entrepris une étude préliminaire sur l'état actuel des connaissances relatives aux constantes physiques fondamentales et en fera rapport à la Conférence de Montréal.

Un rapport sera également présenté à Montréal par le Secrétaire de la Commission, le Dr Smit, sur la possibilité d'obtention d'étalons de viscosité, et la question de savoir si la Commission doit s'efforcer de promouvoir la distribution de tels étalons sera examinée.

I.6 Commission de Spectroscopie moléculaire

(Président: Dr H.W. Thompson)

Un Symposium et une Réunion de la Commission ont eu lieu à Bologne du 7 au 12 septembre 1959. Le travail de la Commission s'est poursuivi depuis par correspondance et lors de réunions officieuses groupant des membres européens et américains.

Le rapport sur les étalons de longueur d'onde dans l'infrarouge a été complété dans la gamme de 4000 à 600 cm^{-1}. Les données recommandées ont été réunies en deux parties, l'une destinée à l'utilisation de spectromètres à réseau à grand pouvoir de résolution, l'autre destinée aux petits spectro-

mètres à réseau ou à prismes qui sont plus généralement utilisés en chimie appliquée. Le rapport sera publié par l'IUPAC en mai 1961. Il est prévu d'étendre la région des longueurs d'ondes standards dans l'infrarouge, jusqu'à la région située au-dessous de 600 cm $^{-1}$, dans un prochain rapport.

D'autres discussions ont porté sur une forme de présentation des données de résonance magnétique nucléaire pour les chimistes, qui soit acceptable à la fois pour les chercheurs européens et américains. Parmi les organismes consultés figurent l'American Petroleum Institute, l'American Society for Testing Material, le British Institute of Petroleum et la Chemical Society. On espère pouvoir présenter prochainement une recommandation agréée à ce sujet.

Un projet de recommandation sur la terminologie et la formulation souhaitables pour la dispersion rotatoire optique a été préparée et soumise aux principaux spécialistes de ce domaine.

Bien que certaines divergences d'opinion subsistent, il semble que l'on pourra bientôt faire des propositions précises.

Les membres de la Commission ont examiné des étalons possibles pour les intensités des bandes infrarouges, et les progrès réalisés seront passés en revue à Montréal. On envisagera également les étalons possibles de longueurs d'onde dans l'ultraviolet lointain. Il a également été décidé d'étendre la terminologie concernant les vibrations moléculaires, qui a été examinée précédemment ainsi que sa traduction en différentes langues.

Suite à la suggestion de l'IUPAP, une *Commission triple de Spectroscopie* formée à partir de l'IUPAP, de l'IUPAC et de la IAU est maintenant définitivement établie, et, après discussion avec le Comité exécutif de l'IUPAC, on s'est mis d'accord sur la désignation de H. W. Thompson et R. C. Lord comme membres de l'IUPAC, et de S. Mizushima, R. N. Jones et J. Lecomte comme membres correspondants. La Commission triple a tenu une réunion préliminaire à Ottawa en septembre 1960, à laquelle assistèrent R. C. Lord et R. N. Jones par suite d'un accord spécial, et elle prévoit de se réunir de nouveau à Columbus en juin 1961. La Commission triple à déjà donné son accord préliminaire aux étalons de longueur d'onde dans l'infrarouge mentionnés plus haut.

I.8 Commission mixte de Radio-activité appliquée

(Président: Dr H. Seligman)

Des réunions de la Commission ont eu lieu à Paris le 27 octobre 1959 et à Copenhague le 5 septembre 1960. En outre, une assemblée d'experts a été réunie à Vienne les 13 et 14 juin 1960 par le Prof. B. Karlik.

Comme résultat de ces réunions, la Commission a marqué son agrément sur les points suivants:

Une source actuelle de radium ne convient pas bien comme standard de radio-activité, excepté pour une comparaison interne avec le radium lui-même. Le besoin actuel semble être le choix d'une méthode standard pour chaque nuclide ou groupe de nuclides radio-actifs présentant des propriétés de radiation similaires.

L'opinion a été émise qu'il devrait être possible de choisir un nombre limité de nuclides radio-actifs de longueur de vie convenable et présentant des énergies de radiation différentes et de prescrire une méthode standardisée pour la mesure de chacun de ces groupes. Cette méthode standardisée devrait être vérifiée par échange d'échantillons entre différents laboratoires. Il devrait alors être possible d'inclure chaque nuclide radio-actif dans l'un des groupes choisis ayant des caractéristiques similaires, en vue d'appliquer la méthode convenable de standardisation.

Le vœu exprimé par la Commission a été communiqué au Bureau international des Poids et Mesures, à la Commission internationale de Protection radiologique, à l'Organisation internationale de normalisation et à de nombreux laboratoires nationaux de haut standing, s'occupant de la préparation d'étalons radio-actifs.

En outre, sur suggestion de la Commission, l'IAEA (International Atomic Energy Agency) a préparé une liste de références de publications traitant de procédés et de techniques qui ont été développés en chimie et en physique nucléaires et qui peuvent présenter de l'intérêt pour des personnes ne travaillant pas dans le domaine de la radio-activité.

Cette liste de références a été adressée à environ 250 institutions, et la Commission attendra des réponses à cet envoi avant de prendre décision en ce qui concerne l'opportunité d'une poursuite de ce travail.

En coopération avec l'IAEA, un symposium sur la détection et sur l'emploi du tritium dans les sciences physiques et biologiques a été tenu à Vienne du 3 au 10 mai 1961.

Prochaines réunions: Une réunion à organiser en liaison avec l'IAEA au sujet de l'emploi de radio-isotopes aura probablement lieu du 23 août au 1er septembre 1961 environ, et un symposium concernant la détermination de l'âge est prévu pour début 1962.

Comité international de Thermodynamique et de Cinétique électrochimiques CITCE

(commission affiliée) (Président: Dr M. Pourbaix)

Le CITCE a tenu les trois réunions suivantes:
- du 28 septembre au 2 octobre 1959 à Vienne, sa 11e réunion plénière,
- du 29 août au 3 septembre 1960 à Bruxelles, une réunion restreinte,
- du 24 au 29 avril 1961 à Bruxelles, sa 12e réunion plénière.

La *réunion plénière de Vienne*, au cours de laquelle a été célébré le 10e anniversaire du CITCE et dont une partie a été tenue conjointement avec une réunion du Verein Österreichischer Chemiker, a eu comme thème principal l'*Electrocristallisation*. Les 6 Commissions suivantes du CITCE se sont réunies à cette occasion:

Commission 1, *Diagrammes tension pH* (rapporteur: M. Pourbaix); Commission 2, *Nomenclature et Définitions électrochimiques* (rapporteur: P. van Rysselberghe); Commission 3, *Méthodes expérimentales en Electrochimie* (rapporteur: H. Fischer); Commission 4, *Piles et Accumulateurs* (rapporteur: J.-P. Brenet); Commission 5, *Corrosion* (rapporteur: M. Pourbaix); Commission 6, *Cinétique électrochimique* (rapporteur a.i.: H. Fischer). Des comptes rendus de cette réunion ont été publiés dans les «Electrochimica Acta».

La *réunion restreinte de Bruxelles* a consisté en des réunions des commissions 1 *(Diagrammes tensions-pH)*, 2 *(Nomenclature et Définitions électrochimiques)* et 5 *(Corrosion)*. Un compte rendu de cette réunion a été publié dans le «Rapport technique» RT90 du CEBELCOR (février 1961).

La *réunion plénière de Bruxelles*, dont une partie a consisté en un colloque *Electrochimie et états de surface*, organisé dans le cadre des manifestations du 10e anniversaire du Centre belge d'Etude de la Corrosion CEBELCOR, a eu comme thème principal la *Corrosion*. Les Commissions 1, 2, 3, 4, 5 et 6 du CITCE se sont réunies à cette occasion. Des comptes rendus de la réunion seront publiés dans les «Electrochimica Acta».

Les mandats de 4 membres du Bureau du CITCE (président M. Pourbaix, vice-présidents A. Rius, H. Fischer et G. Charlot) étant venus à terme lors de la réunion de Bruxelles et n'étant pas renouvelables, la com-

position du Bureau a été profondément modifiée à l'issue de cette réunion, et s'établit actuellement comme suit:

Ancien président:	M. Pourbaix (Belgique)
Vice-président:	J.-P. Brenet (France)
» »	L. Cavallaro (Italie)
» »	A. N. Froumkine (URSS)
» »	G. Valensi (France)
Membre:	S. Tajima (Japon)
Secrétaire général:	N. Ibl (Suisse)

Le CITCE tiendra ses prochaines réunions plénières selon le calendrier suivant:

13e réunion: 7–9 août 1961 à Montréal
14e réunion: septembre 1962 à Rome
15e réunion: septembre 1963 à Moscou

Conclusion

Un travail considérable et efficace a été accompli par les Commissions. Il est important de noter que tous les intéressés ont accordé beaucoup d'attention, d'une part à la coordination des activités des Commissions de l'IUPAC travaillant dans des domaines connexes, et d'autre part, à l'établissement d'un contact effectif avec les organismes extérieurs à l'IUPAC.

Président de la Section de Chimie Physique. W. Kuhn

RAPPORT SUR L'ACTIVITÉ PENDANT LA CONFÉRENCE DE MONTRÉAL

2–5 août 1961

Toutes les réunions de la Section et de ses Commissions prévues au programme de la Conférence ont été tenues. Un symposium, organisé par la Commission de Chimie macromoléculaire, a eu lieu à Montréal du 27 juillet au 1er août et remporta beaucoup de succès.

Le Président de la Section prit part aux réunions du Bureau et du Conseil les 2 et 5 août. Le 2 août, il donna un rapport sur l'activité de la Section de Chimie physique durant la période d'août 1959 à mai 1961 (voir rapports résumés des Sections, distribués avant la 21e Conférence).

Propositions et résolutions soumises au Bureau et au Conseil

Le Président de la Section a soumis trois propositions et résolutions au Bureau et au Conseil:

1° *Proposition de créer une Commission de Chimie des Colloïdes et des Surfaces*

Lors de la réunion du Bureau et du Conseil du 2 août 1961, le Président de la Section soumit une proposition, faite par Sir Eric Rideal, demandant à l'Union Internationale de Chimie pure et appliquée la création d'une division ou commission de la Chimie des Colloïdes et des Surfaces. Sir Eric Rideal, qui était présent, avait déjà souligné quatre ans auparavant que la chimie des surfaces et des colloïdes est un vaste domaine de la science qui, jusqu'à maintenant, n'a pas été représenté comme il l'aurait fallu au sein de l'Union internationale de Chimie pure et appliquée (Bulletin d'Information, n° 8, p. 50–51, 1959). En avril 1961, il exposa en plus de détail ses idées (Bulletin d'Information, n° 14A, p. 39–41, 1961) qu'il reprit brièvement lors de la réunion. Le Président de la Section, qui avait discuté la proposition de Sir Eric Rideal avec plusieurs experts par correspondance ou personnellement, recommanda finalement au Bureau et au Conseil la création d'une *Commission de Chimie des Colloïdes et des Surfaces* de 8 membres, rattachée à la Section de Chimie physique avec une durée provisoire de 4 ans. Les tâches de cette Commission seront spécialement:

a) *Symboles et terminologie dans les recherches de base*, p. ex. les symboles pour l'énergie, l'énergie libre, l'entropie par unité de surface, pour la chaleur d'absorption à volume constant, à pression constante, à surface de recouvrement constante, pour la pression superficielle, la viscosité superficielle;

b) *Définitions:* p. ex. grandeur et signe de potentiels de jonction de phases, volume de pores, densité apparente, densité de particules, types d'isothermes;

c) *Accord* concernant la description de solides finement divisés au moyen de l'indication de l'absorption par gramme de matériaux de gaz, tels que l'azote, l'argon, etc.;

d) *Conventions* sur la dénomination des systèmes colloïdaux (p. ex. coacervates, synérésis, tactasols, etc.);

e) *Symposia* sur des problèmes spéciaux.

Cette proposition, qui a aussi été recommandée à l'unanimité par les Présidents de Sections réunis à Londres le 26 juin, a été adoptée par le Bureau et le Conseil.

A la séance du Conseil du 5 août, une autre résolution a été présentée par le Président de la Section concernant:

Dans le cas de problèmes purement *électrostatiques*, en particulier lors de la définition et de la description du moment dipolaire, l'emploi d'unités électrostatiques a été de pratique commune dans le passé. L'avantage que présente l'utilisation de ce système est basé sur le fait que, si on emploie le système CGS, l'énergie de deux charges e_1 et e_2 à distance r est simplement

$$U = \frac{e_1 e_2}{r} \text{ Erg}$$

La charge d'un électron ou proton est $e = 4{,}80 \cdot 10^{-10}$ u.e.s. si on emploie ce système.

D'autre part, dans le cas de problèmes concernant des *courants électriques*, il est de pratique presque universelle d'employer des coulombs, des ampères, des volts et des unités en dérivant. Si on utilise ce système, la charge d'un électron ou proton est $e = 1{,}60 \cdot 10^{-19}$ C. Un désavantage de ce système est dû au fait qu'un facteur numérique intervient dans l'expression de l'énergie U de deux charges e_1 et e_2 à distance r; si on utilise le système MKSA d'unités, l'énergie U est dans ce cas

$$U = \frac{e_1 e_2}{r \cdot 9 \cdot 10^9} \text{ Joule}$$

Un grand avantage du système MKSA (où les longueurs sont exprimées en mètres, les masses en kilogrammes, etc.) est, d'autre part, que l'énergie (produit de la charge par le potentiel) apparaît en joules dans un système où les charges électriques sont données en coulombs et les potentiels en volts, et que l'énergie apparaît aussi en joules dans un système purement mécanique si les longueurs sont mesurées en mètres et les masses en kg, p.ex. $U = \frac{m}{2} u^2$ où u est la vitesse en $\text{m} \cdot \text{s}^{-1}$. Comme conséquence de ceci, aucun facteur numérique n'intervient dans le calcul de l'énergie cinétique d'une particule de charge e et de masse m qui se déplace à travers une différence de potentiel de E volt; une remarque correspondante s'applique de manière générale à tout problèmes où interviennent à la fois des quantités électriques et des quantités mécaniques.

Ceci montre clairement qu'une énorme simplification résulterait de l'adoption du mètre et du kilogramme (au lieu du cm et du g), c'est-à-dire par l'adoption générale du système MKSA. Il faut cependant tenir compte de ce qu'une grande partie de données physicochimiques est chiffrée dans les ouvrages pédagogiques courants et dans les tables numériques en unités CGS qui, lorsqu'elles ne font pas intervenir d'unités électriques, ne diffèrent d'unités MKSA que par des puissances de 10. Il ne semble pas être à conseiller, pour une raison de convenance pratique, de remplacer ces données pour l'usage journalier par les unités MKSA, p.ex. d'exprimer des concentrations en kg m^{-3}, le cm et le g étant dans la plupart des cas d'usage plus commode que le m et le kg pour la description d'appareillage et de résultats de laboratoire.

Nous attirons donc l'attention sur les simplifications qui deviennent possibles si les charges électriques sont exprimées en coulombs au lieu d'unités électrostatiques, et sur la simplification obtenue dans des problèmes mettant en jeu à la fois des quantités électriques et des quantités mécaniques par l'utilisation du système MKSA.

Pour ces raisons, il est *recommandé*:

1° que le coulomb et le volt, et des unités en dérivant, soient utilisés dans les problèmes électriques;

2° que, dans les problèmes faisant intervenir à la fois des quantités électriques et des quantités mécaniques, les unités du système MKSA soient utilisées comme unités de base.

Cette recommandation a été discutée et acceptée à l'unanimité par: a) la Commission de Symboles et Terminologie; b) le Comité de Section; c) l'Assemblée générale de la Section de Chimie physique. Elle a été adoptée le 5 août par le Conseil, pour publication préliminaire.

Une deuxième recommandation, exposée ci-après, a aussi été présentée le 5 août au Conseil:

3° *Symboles pour les Energies Libres de Helmholtz et de Gibbs*

Il y a accord général pour que le symbole de l'énergie soit

Energie E ou U

et pour que le symbole de l'enthalpie (qui diffère de U [ou E] par le terme additionnel pV) soit:

Enthalpie $H = U + pV$

L'énergie libre de Helmholtz est liée à U par l'équation

Energie libre de Helmholtz $= U - TS$

et nous avons la définition analogue

Energie Libre de Gibbs $= H - TS$

Une difficulté sérieuse est soulevée par le fait que, par suite de développements indépendants dans le passé, un grand groupe de scientistes européens utilise le symbole F pour $U - TS$, alors qu'un groupe de scientistes non européens utilise le même symbole F pour $H - TS$.

Afin d'éliminer les malentendus dus à cette dualité d'emploi du symbole F, il est recommandé: Que, dans la mesure possible, le symbole A soit utilisé pour l'énergie libre de Helmholtz $U - TS$, et que le symbole G soit utilisé pour l'énergie libre de Gibbs $H - TS$.

Il a été recommandé par un groupe de physico-chimistes que l'adjectif «libre» soit supprimé, et que, au lieu des appellations «Energie Libre de Helmholtz» et «Energie Libre de Gibbs», on utilise donc les appellations plus courtes «Energie de Helmholtz» et «Energie de Gibbs». Pendant la réunion de Montréal, l'emploi de l'un et l'autre de ces groupes d'appellations n'a donné lieu à aucun malentendu. Une décision concernant l'emploi ou le rejet de l'adjectif «libre» peut, si nécessaire, être prise après délibérations ultérieures.

La résolution prise à Montréal s'exprime alors comme suit: Afin d'éliminer une controverse de longue durée, il est recommandé de remplacer dans le Manuel des Symboles et de Terminologie physico-chimiques (Londres 1959), pages 14 et 15, les indications données sous les numéros 309 et 311, par:

309	Energie de Helmholtz	(Gibbs $\psi = U - TS$)	A...F*
311	Energie de Gibbs	(Gibbs $\zeta = H - TS$)	G...F*

* Les symboles précédés de trois points sont des variantes à n'utiliser que lorsqu'il y a des raisons pour ne pas utiliser les symboles précédant les trois points.

Cette recommandation a été discutée et acceptée, d'abord par la Commission de Symboles et de Terminologie, en liaison avec la Commission de Thermodynamique chimique, et ensuite par le Comité de Section et par l'assemblée de la Section de Chimie physique. Elle a été adoptée par le Conseil pour publication préliminaire.

Les remerciements les plus sincères sont exprimés à l'adresse du Prof. W. Jost pour la soigneuse préparation de ces deux résolutions.

Elections

Il fallait procéder à des élections pour assurer le bon fonctionnement des Commissions et, en particulier, afin de remplacer les fonctionnaires, les membres titulaires et les membres associés dont le mandat était arrivé à échéance. Des remerciements de la part de l'Union Internationale de Chimie pure et appliquée ont été adressés aux fonctionnaires et aux membres qui se sont retirés, en particulier au Prof. Rossini qui a dirigé les travaux de la Commission de Thermodynamique chimique, actuellement remplacé par le Prof. Schaefer, et au Prof. Pourbaix, qui était secrétaire de la Section et Président de la Commission d'Electrochimie, remplacé dans cette dernière fonction par le Prof. van Rysselberghe.

Le Prof. Schwab a été élu aux fonctions de Président de Section pour 1961–1965. Conformément au nouveau règlement concernant les élections des secrétaires, le Prof. Schwab proposa le Dr G. Emschwiller, secrétaire de la Société de Chimie de France, au poste de secrétaire de la Section. Le Dr G. Emschwiller fut élu d'abord membre du Comité puis désigné par le Prof. Schwab pour être secrétaire de la Section pour la période de 1961 à 1965. Sir Harry Melville a été élu vice-président de la Section de Chimie physique pour la période de 1961 à 1963.

Il se peut que d'autres membres soient élus au comité de Section, afin de disposer de membres du comité susceptibles de devenir vice-président en 1963 et président en 1965.

Le nombre des membres titulaires des diverses Commission a été abaissé en général à 8, conformément à la décision prise par le Conseil.

Afin de préparer les élections des membres titulaires de la Commission des Colloïdes et des Surfaces, un comité d'élection a été formé, composé de Sir Eric Rideal, président présumé, du Dr Zisman, secrétaire présumé de la nouvelle Commission, et du Prof. Schwab, président de la Section. Le Prof. Schwab enverra la liste des membres titulaires au Secrétaire général pour confirmation par le Bureau et les Organismes adhérents.

AUTRES ACTIVITÉS DES COMMISSIONS

En plus des activités des Commissions se rapportant aux résolutions 2 et 3 (voir chap. I) et aux élections, il faut citer les tâches suivantes:

I.1 Commission des Symboles et de Terminologie

(Président: Prof. W. Jost)

Les réunions de la Commission se sont tenues les 2, 3 et 4 août; la dernière demi-heure était une réunion conjointe avec la Commission d'Electrochimie. Le 4 août a eu lieu une réunion supplémentaire conjointe avec la Commission de Thermodynamique chimique. Etaient présents à titre de membres titulaires: W. Jost (Président), M. Brusset (Secrétaire), Farington Daniels, J.I. Gerassimov, A. Ölander, G. Waddington.

Etaient présents, à titre d'observateurs: W. Jaenicke, C. A. Gabrielson (2 août).

La Commission estime qu'une coopération étroite avec l'Organisation Internationale de Normalisation (ISO) et l'Union Internationale de Physique pure et appliquée (IUPAP) (SUN) est indispensable pour ses activités futures.

Conformément aux suggestions faites précédemment par le Prof. J.A. Christiansen, la Commission se propose de donner des définitions des quantités contenues dans le Manuel, de fixer des unités en accord avec les règles MKSA et de recommander des unités pratiques pour le chimiste.

Si possible, une édition revisée du Manuel sera proposée lors d'une réunion de la Commission en 1963.

La Commission a adopté en principe une proposition des savants soviétiques concernant les définitions des vitesses de réaction qui seront données en 1963.

M. BRUSSET représentera la Commission à la réunion de la «SUN-Commission» qui aura lieu à Paris du 4 au 8 décembre. La Commission autorise M. BRUSSET à consulter des experts en chimie appliquée et en génie chimique et le prie de présenter à la Commission un rapport sur les questions de symboles et de terminologie pour autant qu'ils concernent la chimie physique.

Une réunion de la Commission est prévue à Londres, en 1963.

I.2 Commission de Thermodynamique chimique

(Président: Dr F.D. ROSSINI)
(Nouveau Président: Prof. K. SCHAEFER)

Des réunions de la Commission principale se sont tenues les 2 et 4 août. La Sous-Commission de Thermochimie expérimentale et la Sous-Commission de Thermodynamique expérimentale se sont réunies conjointement en une session le 3 août 1961.

La Sous-Commission de Thermochimie expérimentale a tenu des réunions les 2 et 3 août.

La Sous-Commission de Thermodynamique expérimentale a tenu une réunion le 2 août 1961.

La Commission principale de Thermodynamique chimique a tenu une réunion conjointement avec la Commission des Symboles et de Terminologie physico-chimiques de l'IUPAC, le 4 août 1961.

La Commission principale de Thermodynamique chimique a tenu une réunion close exécutive le 4 août 1961.

Les personnes suivantes étaient présentes aux réunions appropriées de la Commission principale et des deux Sous-Commissions:

Membres titulaires de la Commission de Thermodynamique chimique: K. SCHÄFER, Secrétaire (Allemagne), J. COOPS (Pays-Bas), D.M. NEWITT (GB), K.S. PITZER (USA), H.A. SKINNER (GB), B. VODAR (France), G. WADDINGTON (USA), F.D. ROSSINI, Président (USA).

Membres titulaires de la Sous-Commission de Thermochimie expérimentale: H.A. SKINNER, Président (GB), S. SUNNER, Secrétaire (Suède), J. COOPS (Pays-Bas), M. COLOMINA (Espagne), G. WADDINGTON (USA), W.N. HUBBARD (USA), J.D. COX (GB).

Membres titulaires de la Sous-Commission de Thermodynamique expérimentale: D.M. NEWITT, Président (GB), G. WADDINGTON, Secrétaire (USA), J.A. MORRISON (Canada), B. VODAR (France), K.S. PITZER (USA).

Observateurs de la Commission de Thermodynamique chimique: C.W. BECKETT (USA), J.I. GERASSIMOV (URSS), R. HARA (Japon).

Observateurs de la Sous-Commission de Thermochimie expérimentale: J.P. McCULLOUGH (USA), B.J. ZWOLINSKI (USA), E.J. PROSEN (USA).

Observateurs de la Sous-Commission de Thermodynamique expérimentale: J.P. McCULLOUGH (USA), B.J. ZWOLINSKI (USA), E.F. WESTRUM (USA), E.F.G. HERINGTON (GB).

Dans son plan d'activités, la Commission a prévu:

a) de continuer à publier le Bulletin de Thermodynamique et de Thermochimie qui compte actuellement quelque 130 pages in-quarto avec un tirage pour 1962 de 1000 exemplaires. Ce bulletin, qui est rédigé par des membres de la Commission, est distribué dans le monde entier. Actuelle-

ment, il est aussi demandé par les instituts d'énergie atomique et de recherches spatiales. Une subvention de US$ 1000.— est requise.

b) Edition du vol. II du livre «Thermochimie expérimentale» («Experimental Thermochemistry») sous la direction du Dr H. A. SKINNER. Cette édition doit paraître à la fin de 1961.

c) Edition du vol. I du livre «Thermodynamique expérimentale, calorimétrie de systèmes non réactifs» (Experimental Thermodynamics, Calorimetry of non-reacting Systems) sous la direction du Dr J.P. MCCULLOUGH. Ce volume doit paraître, nous l'espérons, en 1963.

d) Edition du vol. II du livre «Thermodynamique expérimentale – Propriétés de fluides» (Experimental Thermodynamics – Properties of Fluids) qui est actuellement en préparation sous la direction de M.B. VODAR.

e) Patronage d'un projet incluant la préparation et la publication de Tables de l'Union internationale de Chimie pure et appliquée sur les propriétés thermodynamiques des gaz (y compris quelques propriétés de transport). Ce projet dont la réalisation sera entreprise par le Prof. NEWITT, comprendra: 1° le contrôle des données existantes; 2° l'identification des domaines dans lesquels ces données sont incomplètes; 3° la mise en route des travaux visant à compléter ces domaines; 4° la publication de Tables de l'Union internationale de Chimie pure et appliquée.

La Commission demande l'approbation en principe de ce projet par l'IUPAC et son appui si la Commission doit requérir des moyens matériels provenant de fonds connus de la Commission, disponibles spécifiquement pour ce projet.

f) Patronage d'un symposium de 3 à 4 jours sur la thermodynamique et la thermochimie devant être organisé par le Dr STIG SUNNER. Ce symposium, co-patronné par des sociétés scientifiques suédoises, doit avoir lieu à Lund en été 1963, juste avant la Conférence de l'Union internationale de Chimie pure et appliquée. Une subvention de 2000 $ est demandée dans ce but.

I.3 Commission d'Electrochimie

(Président: Prof. M. POURBAIX)
(Nouveau Président: Prof. P. VAN RYSSELBERGHE)

Des réunions de la Commission se sont tenues les 3 et 4 août 1961. Les personnes suivantes étaient présentes aux deux réunions: Dr POURBAIX, Président; Prof. VAN RYSSELBERGHE, Vice-Président; Prof. VALENSI, Secrétaire; membres titulaires: Dr HAMER, Dr IBL; membres associés: Dr BATES, Prof. DEFAY, Prof. KETELAAR; invités: Mrs. REID, Dr WAGMANN.

Les personnes suivantes étaient présentes seulement à une réunion: membres associés: Prof. FEITKNECHT, Prof. HUBER; invité: Prof. DELIMARSKII.

Les personnes suivantes se sont excusées: membres titulaires: Prof. A.N. FROUMKINE, Prof. E. LANGE.

Deux documents sont prêts pour la publication préliminaire:

a) Tables sur les données thermodynamiques (préparées par le Prof. M. POURBAIX, par le Dr W.J. HAMER et par leurs collaborateurs, Sous-Commission 2.1);

b) Rapport sur les symboles et la terminologie électrochimiques (préparé par le Prof. P. VAN RYSSELBERGHE et ses collaborateurs).

Le plan d'activités futures prévoit:

1° *dans la Sous-Commission I* (Symboles et Terminologie électrochimiques) de poursuivre les travaux concernant la nomenclature électrochimique et les définitions se rapportant aux thèmes suivants: systèmes électro-

chimiques non isothermes et principes de cinétique électrochimique. Collaboration avec la Commission des Symboles et de Terminologie physicochimiques de l'Union internationale de Chimie pure et appliquée;

2° *dans la Sous-Commission II* (Données de Thermodynamique électrochimique):

a) *Tables des données thermodynamiques.* La Sous-Commission désire promouvoir et diriger le rassemblement des valeurs sélectionnées pour les données thermodynamiques présentant un intérêt pour l'électrochimie. Ceci sera effectué en collaboration étroite avec la Commission des Données électrochimiques et avec la Commission des Données d'Equilibre (Section de Chimie analytique).

b) *Diagramme d'Equilibres électrochimiques.* La Sous-Commission désire promouvoir et diriger l'établissement de diagrammes d'équilibres électrochimiques;

3° *dans la Sous-Commission III* (Données de Cinétique électrochimique). La Sous-Commission désire promouvoir et diriger l'étude critique de méthodes expérimentales et leurs résultats (courbes de polarisation, courants d'échange, coefficients de transfert, etc.).

Réunions et symposia prévus

Pour 1962 Rome (septembre 1962): Réunion des trois Commissions, à l'occasion de la 13e réunion annuelle du CITCE.

Pour 1963 Il est prévu que la Commission entière se réunisse à Londres (juillet 1963) à l'occasion de la 22e Conférence de l'Union Internationale de Chimie pure et appliquée.

Il est également prévu que les trois Commissions se réunissent à Moscou (septembre 1963) à l'occasion de la 14e réunion annuelle du CITCE.

I.4 Commission de Chimie macromoléculaire

(Président: Sir Harry Melville)

Des réunions de la Commission de Chimie macromoléculaire se sont tenues à Montréal les 28 et 31 juillet 1961.

Les personnes suivantes étaient présentes:

Président: H.W. Melville (GB)

Membres titulaires: V.A. Kargin (URSS), C. Sadron (France), I. Sakurada (Japon).

Représentants nationaux: H. Benoit (France), J.W. Breitenbach (Autriche), O. Ellefsen, (Norvège), J.D. Ferry (USA), J. Furukawa (Japon), G.M. Guzman (Espagne), W.R. Krigbaum (USA), H.L. Williams (Canada), M. Magat (France), A. Nasini (Italie), S.R. Palit (Inde), G. Smets (Belgique), A.J. Staverman (Pays-Bas), V.N. Tsvetkov (URSS), K. Vesely (Tchécoslovaquie), I.O. Wichterle (Tchécoslovaquie).

Autres: G. Dring (GB), Président de la Division des Plastiques, etc.; M. Goodman (USA), représentant H. Mark; M.L. Huggins (USA) et **S.M. Atlas (USA), auteurs du Rapport sur la Nomenclature des Polymères stéréo-régularisés; M. Kryszewski (Pologne), représentant T. Urbanski; G. Mayerhoff (Allemagne), représentant W. Kern; *R. Morf (Suisse), Secrétaire général de l'IUPAC; **G.M. Kline (USA), Secrétaire de la Commission des Plastiques et hauts Polymères (IUPAC); **W. Kuhn (Suisse), Président de la Section de Chimie physique.

* présent à la réunion du 28 juillet uniquement; ** présents à la réunion du 31 juillet uniquement.

Durant le symposium (du 27 juillet au 1er août), un rapport fait par la Commission spéciale de Nomenclature des Polymères stéréo-régularisés (présidée par le Dr Huggins) a été adopté et sera remis à la Commission de Publication pour publication préliminaire. Des traductions de ce docu-

ment seront faites en russe, français, allemand, italien, espagnol, japonais, polonais et en tchèque.

Des rapports seront établis sur les réactivités relatives dans les réactions des produits hauts polymères et sur la mesure de la tacticité.

Des échantillons standard de polystyrène ont été envoyés pour détermination du poids moléculaire à 20 laboratoires. Une excellente concordance a été obtenue pour les poids moléculaires allant de 50000 à 250000. Une concordance moins bonne a été enregistrée pour des poids moléculaires de plus de 1000000. Les observations faites par les divers laboratoires qui ont procédé à ces travaux feront l'objet d'un rapport définitif.

Cette expérience ayant été concluante, il est possible en principe d'établir une série internationale d'étalons. La prochaine étape consistera à inviter les laboratoires nationaux d'étalons des divers pays intéressés à considérer comment des sous-étalons pourront être mis régulièrement à la disposition des personnes qui en ont besoin.

Réunions futures

Une discussion générale a démontré qu'il n'est ni possible ni souhaitable que de grands symposia (de plus de 1000 participants) consacrés à l'étude des polymères aient lieu fréquemment. Il est difficile pour chaque pays, et plus particulièrement pour les plus petits d'entre eux, d'assumer les travaux d'organisation. Les diverses matières soumises à ces symposia sont souvent trop vastes pour permettre de réaliser des progrès sensibles dans le domaine des produits de haute polymérisation. On a admis qu'en principe de telles conférences ne devraient pas avoir lieu à des intervalles de moins de deux ans. En revanche, de petits colloques consacrés à des sujets plus restreints pourraient être organisés entre les grands symposia. Ainsi, la Commission pourrait se vouer à ses affaires courantes à des intervalles suffisamment rapprochés. Cette manière d'agir s'impose si l'on considère le grand nombre des délégués nationaux.

Il a été convenu que la Commission se réunira en 1962 mais qu'aucun colloque ne sera organisé conjointement à la réunion. Le lieu de celle-ci doit encore être fixé.

Le prochain symposium aura lieu à Paris en juillet 1963, après le Congrès de Londres.

Il est probable qu'un symposium sera organisé en Inde, vers la fin de 1964.

Le délégué du Japon a invité la Commission à se rendre dans son pays en 1966. Il est probable qu'on lui demandera d'organiser un symposium à ce moment-là.

Les démarches en vue d'une coopération avec le groupe des Plastiques et Produits de haute Polymérisation de l'Union internationale de Chimie pure et appliquée sont en bonne voie.

I.5 Commission des Données et Etalons physico-chimiques

(Président: Dr E. Wichers)

Les réunions se sont tenues les 3 et 4 août 1961. Les personnes suivantes étaient présentes: Dr E. Wichers, Président (USA), Dr S. Sunner, Vice-Président (Suède), Dr W.M. Smit, Secrétaire (Pays-Bas), A.L.G. Rees, Dr (Australie), Dr Ch. Proffer (USA), Dr L.A.K. Staveley (GB).

Membre Associé: Dr R.P. Graham (Canada).

Invités: Dr G. Waddington, Prof. Timmermans.

Le Dr Saylor a présenté un rapport sur le test coopératif concernant le contrôle de pureté par analyse thermique. La Commission propose de faire paraître ce rapport ainsi que les comptes rendus du Symposium à ce sujet qui se tiendra à Ottawa dans le cadre de la Conférence de Calorimétrie dans le journal «Chimie Pure et Appliquée» et de le faire réimprimer séparément.

En outre, la Commission a reçu et discuté une proposition des Drs G. Sunner et G. Waddington, qu'une monographie soit préparée par la Commission concernant la purification et le contrôle de pureté. La matière va être discutée dans tous ses détails par correspondance, après le Symposium d'Ottawa dont on attend de nouveaux résultats concernant le problème de la détermination de pureté.

Le Dr Smit s'efforcera d'organiser un test comparatif et coopératif pour la détermination de la viscosité.

La formation d'une commission mixte avec l'Union internationale de Physique pure et appliquée est considérée en vue de la préparation d'une liste des constantes de base physico-chimiques (constante de Faraday, nombre d'Avogadro, etc.). Comme délégués présumés de l'Union Internationale de Chimie pure et appliquée, la Commission propose les Drs E. A. Guggenheim, G. P. Saylor, L. A. K. Staveley, J. Terrien et le Dr G. Waddington.

Le Dr Rees présenta un rapport du Dr J. D. Morrison sur les potentiels d'ionisation. Pendant la Conférence de Montréal, le Dr Rees a pris un premier contact avec le Dr H. W. Thompson, Président de la Commission de Spectroscopie moléculaire.

Le Dr Wichers fit un rapport concernant quelques nouveaux standards thermométriques utilisant la congélation lente du phénol (41 °C), de la naphtaline (80 °C) et de l'anhydride phtalique (131 °C) pour établir des températures de référence. Les cellules sont prévues en premier lieu pour l'étalonnage de «thermomètres à point de solidification». Les températures maximales dans ces cellules semblent pouvoir être reproductibles avec une précision de quelques millièmes de degrés centigrades.

La proposition du Prof. Swietoslawsky concernant la nomenclature des azéotropes sera différée jusqu'à la parution de son livre. L'utilité de soumettre cette proposition à la Commission des Symboles et Terminologie physico-chimiques va être étudiée.

Le Dr G. Waddington (invité à assister à une partie de la séance) fit un rapport sur le travail effectué par le bureau des Critical Tables, branche du National Research Council (USA).

Le Prof. Timmermans fit l'historique du Bureau international des Etalons physico-chimiques, dont les activités étaient terminées à l'issue de son activité à l'Université de Bruxelles. Le Prof. Timmermans déclara qu'en donnant ce dernier exposé, il allait se retirer de la Commission avec laquelle il avait été associé dès le début. Le Président remercia le Prof. Timmermans au nom de la Commission pour son aide longue et fructueuse.

Un symposium sur le contrôle de pureté par analyse thermique a été tenu conjointement avec la Conférence internationale de Calorimétrie à Ottawa, le 18 août 1961. Les résultats des tests comparatifs entrepris par 20 laboratoires ont été discutés. Il apparaît que, en général, les mesures furent plus concordantes qu'on ne l'aurait attendu en vue des examens précédents.

La prochaine réunion de la Commission est prévue pour 1963 (Conférence de Londres).

I.6 Commission de Spectroscopie moléculaire

(Président: Dr H.W. Thompson)

Des réunions ont été tenues les 3 et 4 août 1961. Les personnes suivantes étaient présentes:

Membres titulaires: H.W. Thompson, Président (GB), R.C. Lord, Vice-Président (USA), R.N. Jones, Secrétaire (Canada), J.A.A. Ketelaar (Pays-Bas), J. Lecomte (France), R. Mecke (Allemagne), S. Mizushima (Japon).

Membres associés: R.R. Brattein (USA), M. Kent Wilson (USA).

Conseiller: G. Herzberg (Canada).

Observateur national: T. Urbanski (Pologne).

Par invitation: V.N. Kondratiev (URSS)

Les personnes suivantes se sont excusées: A. Mangini (Italie), A.N. Terenin (URSS) et G. v. Duyckaerts (Belgique).

Les relations avec la Commission triple de Spectroscopie, nouvellement formée, ont été discutées et des rapports ont été entendus sur les deux premières réunions de cet organisme.

Des projets d'extension des tables sur les étalons de nombres d'ondes en infrarouge de 600 cm^{-1} à 10 cm^{-1} ont été discutés. Afin d'accélérer les travaux, la Sous-Commission a été réorganisée et on a fait appel à des spécialistes dans le domaine de la spectroscopie dans l'extrême infrarouge.

Le problème des étalons d'intensité infrarouge a été discuté. On remarqua que les demandes de tels étalons ont augmenté du fait qu'un plus grand nombre de chimistes emploient des spectromètres à grille. Il sera encore nécessaire d'entreprendre des recherches étendues jusqu'à ce qu'on puisse établir ces étalons.

Des progrès importants ont été réalisés dans la normalisation de l'enregistrement des spectres de résonance nucléaire magnétique. Il sera vraisemblablement possible d'obtenir un accord définitif dans un proche avenir.

On fit également mention des progrès réalisés dans la normalisation de la nomenclature et de la représentation des courbes de dispersion rotatoire optique. Un rapport définitif sera prêt très prochainement.

On souligna la nécessité de disposer d'étalons pour les longueurs d'ondes et l'intensité dans le domaine de l'ultra-violet entre 1750 Å et 2200 Å. A cet effet, un groupe de travail a été formé.

Des plans de normalisation de la traduction des termes spectroscopiques dans les langues scientifiques usuelles ont été établis.

La prochaine réunion aura lieu à Tokyo, en septembre 1962, conjointement au Symposium de Structure moléculaire et de Spectroscopie.

I.8 Commission mixte de Radioactivité appliquée

(Président: Dr H. Seligman)

Cette Commission ne s'est pas réunie à Montréal.

Comité international de Thermodynamique et Cinétique électrochimique. CITCE

(Commission affiliée, Président: Prof. H. Fischer)

Le Bureau et le Conseil du CITCE se sont réunis à Montréal le 8 août 1961. Il a été décidé que la prochaine réunion du CITCE aura lieu à Rome du 24 au 28 septembre 1962 et aura pour sujet principal: les récentes méthodes d'étude de cinétique des électrodes et leur application.

La Commission de Nomenclature et Définitions électrochimiques, sous la présidence du Prof. van Rysselberghe, discuta en particulier le chapitre de la cinétique électrochimique qui fait partie du rapport de cette commission. L'application des termes «tension» ou «potentiel» en électrochimie donna lieu à une longue discussion.

La partie du XVIIIe Congrès de Montréal, réservée à l'électrochimie, a été organisée par le Comité international de Thermodynamique et de Cinétique électrochimiques et la Commission d'Electrochimie de la Section de Chimie physique de l'Union internationale de Chimie pure et appliquée. Le Dr Cohen, secrétaire national du CITCE du Canada et le Prof. Wetmore se chargèrent de l'organisation des réunions consacrées à l'électrochimie.

56 travaux rapportant les progrès réalisés dans le domaine de la cinétique des électrodes et de l'électrochimie des sels fondus ont été présentés.

Conclusion

Les diverses Commissions ont fourni un travail intense et précieux. Des résultats importants ont été obtenus, parmi lesquels il faut citer avant tout l'accord qui se traduit par les résolutions concernant les systèmes d'unités CGS et MKSA d'une part et les symboles pour les énergies libres d'Helmholtz et de Gibbs, d'autre part. Il ne faut pas omettre de souligner que des concessions faites de part et d'autre ont permis d'obtenir de tels accords. Grâce au parfait esprit de coopération qui régna dans toutes les négociations et discussions, d'importants problèmes purent être résolus.

W. Kuhn, Président

II. SECTION DE CHIMIE MINÉRALE

RAPPORT SUR LES ACTIVITÉS

Ce rapport traite des activités de la Section et de ses Commissions durant la période de 1959 à 1961. On se rappellera que la Section Minérale prit une part importante dans le programme du Congrès de 1959 à Munich. Les années qui se sont écoulées depuis ont été relativement calmes. Le Comité de Section se réunira à Montréal, ainsi que les Commissions sur les Poids atomiques et sur les hautes Températures et Réfractaires, et les Sous-Commissions des Gaz et Etats condensés. Les intérêts de la Commission des hautes Températures sont également très bien représentés dans le programme du Congrès de Montréal. Ci-après suivent les rapports sur les activités des Commissions.

II.1 Commission des Poids atomiques

Une des tâches essentielles de cette Commission, c'est-à-dire l'établissement d'une nouvelle table des poids atomiques, est près d'être terminée. Il fut proposé au Bureau de l'IUPAC à Munich que, vu la nature hautement spécialisée des travaux de la Commission, quelques-uns de ses membres devraient être réélus, ceci bien que leur mandat maximum de 8 ans soit accompli. En fait, 4 membres titulaires furent réélus (y compris le nouveau Président, le Prof. T. Batuecas) avec 4 nouveaux membres titulaires (y compris le nouveau Vice-président et le Secrétaire). De plus, il y a 4 membres associés choisis parmi les membres démissionnaires, donc parfaitement aptes à donner des avis judicieux sur les problèmes à l'étude.

La Commission s'est occupée durant de nombreuses années de la tâche d'établir une échelle unique des poids atomiques, qui pourrait être acceptée par les chimistes aussi bien que les physiciens. La valeur 12.00000 pour 12C a été recommandée pour adoption par les physiciens lors de la Conférence d'Ottawa de l'IUPAP (septembre 1960). Il semble plus que probable qu'après la réunion de la Commission à Montréal une recommandation similaire sera faite pour adoption par l'IUPAC. Les avantages d'une telle échelle unique sont déjà bien connus et les désavantages existants ont été soigneusement examinés par la Commission. Si cette recommandation est présentée et acceptée, il sera nécessaire de publier une table revisée des poids atomiques pour tous les éléments, y compris ceux qui sont radio-actifs. On devra également étudier les tâches futures de la Commission.

II.2 Commission sur la Nomenclature de Chimie minérale

Cette Commission est entrée dans une nouvelle phase de son activité, basée essentiellement sur l'examen de sujets spéciaux par ses Sous-Commissions. La Sous-Commission sur la Nomenclature des composés organo-métalliques, qui est une Sous-Commission mixte avec la Commission de Nomenclature organique, s'est réunie à Scheveningue en juillet 1960. Elle a examiné les principes généraux sur lesquels la nomenclature de ces composés devrait être basée, et ceci fut un bon départ pour l'examen de ce problème délicat. Les autres Sous-Commissions ne se sont pas réunies officiellement, et ni la Commission principale ni les Sous-Commissions ne se rencontreront à Montréal. Un rapport de l'American Chemical Society, intitulé «La nomenclature des composés organiques du bore», a été reçu mais pas encore discuté.

II.3 Commission des hautes Températures et Réfractaires

Le Prof. Brewer ayant résilié, pour raisons de santé, ses fonctions de Secrétaire de la Sous-Commission des Gaz, le Prof. Starkman, de l'Université de Californie, a accepté de le remplacer. Un certain nombre de membres titulaires et associés de la Commission des hautes Températures se sont réunis à l'occasion du Symposium sur la Technologie des hautes Températures qui a eu lieu en octobre 1959 à Asilomar (Californie). Il fut question, au cours de cette réunion, des services bibliographiques rendus par la Commission.

Le service bibliographique a débuté en 1957, à la suite des décisions prises par la Commission des hautes Températures, lors de la Conférence de l'IUPAC à Paris. Le travail s'est poursuivi depuis, sans interruption. Le nombre de pays collaborant, qui était de 3 en 1957, 6 en 1959, a atteint le chiffre de 10 en 1961. La manière dont le service fonctionne est la suivante: un expert dans chacun des pays participants produit une bibliographie des publications de son propre pays dans le domaine des «Etats condensés». Les pays participants actuels sont: l'Australie, l'Autriche, l'Allemagne, le Canada, les Etats-Unis, la France, la Grande-Bretagne, l'Inde, le Japon, la Hollande et les pays scandinaves. Des arrangements provisoires ont été conclus afin d'inclure la littérature de l'URSS, et des démarches sont entreprises afin de comprendre également d'autres pays. Les bibliographies sont publiées dans l'une ou l'autre des 3 langues officielles employées par l'IUPAC, et leur contenu est rédigé selon un plan suggéré par le Prof. Hägg.

C'est le Dr Fœx, Secrétaire de la Sous-Commission des Etats condensés, qui recueille le matériel provenant des pays participants. Ce matériel est ensuite reproduit dans trois centres, dont chacun prend à sa charge les frais de reproduction et de distribution dans une région convenue d'avance. Les trois centres sont:

1° en France: Laboratoire de l'Energie solaire, Montlouis (Dr Fœx environ 500 exemplaires; distribution en Europe, URSS, Australie, Inde et Japon);

2° aux Etats-Unis: National Bureau of Standards, Washington (Dr Walker et Dr Diamond; environ 1000 exemplaires);

3° au Canada: Department of Mines and Technical Surveys, Ottawa (Dr Bright; 200 exemplaires).

Il y a 4 numéros par an et le nombre total des titres, en 1960, fut d'environ 1700. On doit souligner ici que la possibilité d'éditer ces bibliographies comme une part du programme normal des publications de l'IUPAC avait déjà été examinée à Munich en 1959. Le système actuel présente le grand avantage de permettre un minimum de retard et de frais et d'offrir également une certaine flexibilité. Ainsi, par exemple, il fut possible dans la bibliographie d'octobre à décembre 1960 de donner une liste des conférences de section du Symposium de Montréal sur les propriétés thermo-dynamiques chimiques sous de hautes températures. On a également pu y inclure des listes des spécialistes dans le domaine des hautes températures de plusieurs des pays participants. Un examen préliminaire a été fait concernant l'organisation d'un service similaire pour la Sous-Commission des Gaz.

Les principales activités de la Commission des hautes Températures, au sujet desquelles il a été fait un rapport, sont des symposia et la publication (sans aucun frais pour l'Union) des bibliographies. Il est évident que cette dernière activité connaît un grand succès. Bien que relativement nouvelle, elle a d'emblée revêtu un caractère international et il serait difficile d'agir autrement.

II.4 Commission de Géochimie

La Commission de Géochimie a été active en 1960. Elle a désigné un Comité chargé de discuter des problèmes de coopération lors des réunions internationales sur la géochimie. Ce Comité s'est réuni avec l'IUGG à Helsinki et a coopéré avec cette Union en organisant un Symposium sur la Géochimie. Lors de ce symposium, un comité spécial fut désigné par l'IUGG, ayant pour tâches: 1° de superviser les programmes et autres problèmes intéressant les géochimistes au sein de l'IUGG, et 2° de coopérer avec d'autres organisations internationales qui s'intéressent à la géochimie.

Un Symposium sur la Géochimie des roches sédimentaires de carbonate fut organisé et patronné par la Commission en parallèle avec le Congrès international de Géologie qui s'est tenu à Copenhague en 1960. Les comptes rendus de ce symposium paraîtront dans un numéro spécial de «Geochimica et Cosmochimica Acta». Il y eut une réunion plénière de la Commission de Géochimie de l'IUPAC à Copenhague, et quelques-unes des sessions furent tenues conjointement avec le Comité de l'IUGG nommé à Helsinki. La Commission de Géochimie de l'IUPAC et le Congrès international de Géologie ont nommé tous deux des groupes similaires à celui constitué par l'IUGG à Helsinki. Ces trois groupes formèrent alors un Comité inter-Unions officieux chargé d'encourager la coopération dans le domaine de la géochimie parmi les organisations internationales intéressées et de les aider à préparer des programmes et symposia sur la géochimie. Le Prof. KRAUSKOPF, de l'Université de Stanford, est Président de ce Comité, dont le Prof. INGERSON est le Secrétaire. A la suggestion du Dr FRASER, du Secrétariat de l'ICSU, le Comité a sollicité de cet organisme son affiliation en tant que Comité officiel inter-Unions. Une telle demande exige son approbation par les organismes intéressés. Cette approbation a déjà été accordée par l'ICSU et l'on espère que l'IUPAC en fera de même à Montréal.

La Commission n'a pas l'intention de tenir une réunion ou des symposia en relation avec la Conférence de l'IUPAC à Montréal.

Les activités des Commissions des Poids atomiques et de la Nomenclature n'appellent que très peu de commentaires. Toutes deux s'occupent de problèmes pour lesquels un accord international est essentiel. Si, ainsi que nous l'espérons, un agrément international intervient concernant la nouvelle table de poids atomiques, d'autres problèmes resteront encore à examiner. Il y a également un certain nombre de domaines importants dans la nomenclature des composés minéraux qui doivent être étudiés en détail. Nous pouvons donc supposer que ces Commissions poursuivront l'excellent travail qu'elles ont accompli dans le passé. Le travail de la Commission de Géochimie sera grandement facilité, je crois, si la relation de cette Commission avec d'autres organismes s'intéressant à la géochimie peut être clairement établie, ce qui devrait être réglé d'urgence.

H. J. EMELÉUS, Président de la Section de Chimie minérale

III. SECTION DE CHIMIE ORGANIQUE

RAPPORT DES ACTIVITÉS

Un symposium international sur la Chimie des Produits naturels, patronné par l'IUPAC, s'est tenu en Australie (Melbourne, Canberra et Sydney) du 15 au 25 août 1960 sous la présidence de Sir ALEXANDER TODD.

Tous les visiteurs étrangers ont trouvé que l'Australie était l'endroit le plus approprié pour ce symposium, des groupes très actifs de phytochimistes ayant contribué considérablement à notre connaissance de la chimie des produits naturels. Il est intéressant de noter que malgré la distance un grand nombre de participants vinrent d'outre-mer.

Cette réunion mémorable fut organisée d'une façon parfaite et de nombreux organiciens, parmi les plus éminents dans le monde, présentèrent des conférences. Il n'y a aucun doute que ce symposium eut les plus heureuses conséquences pour la recherche dans le domaine des produits naturels en Australie. La plupart des visiteurs étrangers prirent part à une ou plusieurs excursions dans les différentes parties du continent australien. Elles étaient organisées en parallèle avec le symposium et furent conduites par nos collègues australiens.

Un certain nombre de participants particulièrement favorisés furent invités à visiter la Nouvelle-Guinée, un voyage aussi intéressant au point de vue phytochimique que coloré au point de vue ethnologique. Ceux qui y prirent part n'oublieront probablement jamais les visages stupéfaits des Papous lorsqu'ils assistèrent à la pompeuse cérémonie de la remise du titre de Docteur honoris causa ès philosophie de l'Université de Wau à Sir ALEXANDER TODD.

L'organisation du Symposium international sur la Chimie des Produits pharmaceutiques, qui doit se tenir à Florence en septembre 1962, avance à grands pas. Des savants très connus présenteront environ 8 conférences principales couvrant tout le champ allant de l'interaction récepteur-substance active à la chimie de structure des alcaloïdes et antibiotiques.

Le second Symposium international sur les Produits naturels se tiendra à Prague en 1962. Le Président a visité Prague en janvier dernier et reçut toute information concernant cette réunion. La plupart des conférences et autres manifestations auront lieu dans le grand Hôtel International, doté de tout le confort ainsi que de toutes les facilités désirables.

Les organiciens japonais sont en train d'établir des plans au sujet du troisième Symposium international sur la Chimie des Produits naturels, qui aura lieu au Japon en 1964. Il y a de grandes similitudes entre la chimie organique du Japon et celle de l'Australie, les deux pays ayant encouragé l'établissement de grandes écoles de recherche pour les produits naturels. Tenant compte également de l'importance incontestable du symposium autralien pour l'avancement de la recherche dans le domaine des produits naturels en Australie, ainsi que de la grande attraction exercée par ce symposium sur les visiteurs d'outre-mer, on peut espérer que les plans japonais pourront se concrétiser et que l'IUPAC sera à même d'accorder son patronage à cette manifestation.

Une réunion très utile des Présidents de Section eut lieu à Londres en octobre 1960. De nombreux problèmes très importants furent discutés, tels que la situation financière de l'IUPAC, sa politique concernant les publications, les différentes Commissions et l'organisation des Sections.

Une autre réunion des Présidents de Section a eu lieu à Londres en juin 1961, dont l'un des principaux points à l'ordre du jour sera la Conférence de Montréal.

La Commission de Nomenclature organique de l'IUPAC s'est réunie à

Scheveningue (Hollande) du 11 au 16 juillet 1960. Tous les membres de cette Commission étaient présents. Le Prof. K. A. JENSEN (Copenhague), représentant la Commission de Nomenclature minérale de l'IUPAC, et le Prof. Dr A. P. TERENTIEV (Moscou) et le Dr V. M. POTAPOV (Moscou) y assistaient également.

Le sujet principal de ces réunions fut la discussion d'un nombre considérable de rapports préparés par les membres de la Commission et couvrant tout le domaine de la nomenclature des groupes fonctionnels. Des progrès remarquables ont été réalisés grâce à ces travaux.

Le 14 juillet, un comité mixte se composant de quelques membres de la Commission de Nomenclature organique et de la Commission de Nomenclature minérale de l'IUPAC (Prof. JENSEN; Dr J. CHATT, Welwyn, Hertshire, Grande Bretagne; Prof. L. MALATESTA, Milan; Prof. Dr H. REMY, Hambourg) s'est réuni afin de discuter de la nomenclature des composés organométalliques.

Un comité de rédaction de la Commission de Nomenclature organique de l'IUPAC, composé du Dr R. S. CAHN (Londres), Dr G. M. DYSON (Loughborough) et du Dr H. S. NUTTING (Midland, Michigan, USA), s'est réuni quelques jours à Midland à la fin de janvier 1961. Il s'est occupé de rapports sur la nomenclature des groupes fonctionnels, rapports discutés et modifiés lors des réunions de Scheveningue. Ils furent transformés en un ensemble homogène de règles qui deviendront la Section C de la Nomenclature de l'IUPAC sur les composés organiques. Cet ensemble de règles a été rédigé dans la mesure du possible de la même manière que les Sections A (Hydrocarbures) et B (Systèmes hétérocycliques fondamentaux) parues en 1958.

Cet ensemble de règles sera discuté lors de la prochaine réunion de la Commission qui, donnant suite à la généreuse invitation des Américains, se tiendra à Columbus, Ohio, du 20 au 26 juillet 1961. On espère que cette année encore ou en tous les cas en 1962 la Section C sera prête pour publication provisoire par l'IUPAC.

Un petit groupe comprenant des membres des Commissions de Nomenclature organique et biologique de l'IUPAC et des spécialistes dans le domaine des stéroïdes s'est réuni durant quelques jours à Bâle (Suisse) pour discuter de nouvelles propositions pour la nomenclature des stéroïdes.

La Commission de Codification, de Chiffrage et de Triage des Combinaisons organiques de l'IUPAC s'est également réunie à Scheveningue (Hollande) du 6 au 9 juillet 1960 pour une dernière revision du texte du Système international de Notation.

Par la suite, 4 membres de cette Commission, le Dr R. S. CAHN (Londres), le Dr G. M. DYSON (Loughborough), le Prof. W. BAKER (Bristol) et le Prof. P. E. VERKADE (La Haye), se sont rencontrés trois jours à Loughborough en octobre 1960 et ont préparé pour l'imprimeur le texte du Système international de Notation, tel qu'accepté à Scheveningue.

Les épreuves ont déjà été corrigées et le livre sera publié par Longmans au courant de 1961 sous le titre suivant: Règles de l'IUPAC pour la Notation des Composés organiques, établies par la Commission de Codification, de Chiffrage et de Triage des Combinaisons organiques.

La création et la recommandation des «Generic names» pour les composés pharmaceutiques actifs nous cause de grands soucis, et toute notre attention sera vouée à cet important problème. Une coopération dans ce domaine entre l'OMS, l'IUPAC et d'autres organisations sera probablement nécessaire.

H. ERDTMAN, Président de la Section de Chimie organique

IV. SECTION DE CHIMIE BIOLOGIQUE 1959/1960

RAPPORT SUR LES ACTIVITÉS

IV.1 Commission de Nomenclature

Cette Commission s'est réunie à Amsterdam les 17 et 18 avril 1961. Les sujets suivants furent traités:
i) la revision des règles de nomenclature existantes;
ii) le futur travail de la Commission;
iii) les relations avec la Commission des Editeurs de l'IUB (qui sera créée lors de la Conférence de Moscou).

Les règles provisoires sur les abréviations et symboles des noms chimiques d'un intérêt particulier pour la chimie biologique furent publiées comme Annexe B au «Bulletin d'Information» N° 13.

IV.2 Commission de Protéines

Cette Commission s'occupe principalement de la compilation des spécifications de 14 protéines bien définies. Une liste indiquant le genre de données exigées a été préparée par le Prof. J.W. Williams (USA) et distribuée aux personnalités que la Commission a considérées, lors de la Conférence à Munich en 1959, comme faisant autorité dans le domaine des protéines.

Le Dr R. Schwyzer (Suisse) est en train d'examiner la classification des enzymes protéolytiques par leur action sur certains peptides plus grands, par exemple les octapeptides et décapeptides synthétiques, hypertensine II et I. L'activité protéolytique devrait alors être définie par rapport à un peptide «finger print» qui pourrait être très utile pour le contrôle de la pureté de préparations d'enzymes ou pour les étalonnages.

IV.3 Commission de Chimie clinique

La Commission de Chimie clinique a tenu à Edimbourg en août 1960 un congrès qui a remporté un vif succès. 500 à 600 personnes se sont inscrites et une série d'excellents symposia et de réunions eurent lieu, au cours desquelles des communications furent présentées. La Commission s'est réunie plusieurs fois (avant, pendant et après le congrès). Quelques nouveaux membres titulaires et représentants nationaux y furent accueillis pour la première fois. Une invitation fut reçue (et acceptée de principe) de la part de l'American Association of Clinical Chemists et de la Canadian Society for Clinical Chemistry à tenir un congrès dans une ville-frontière (Detroit-Windsor) en septembre 1963. Il fut donné droit à une demande des chimistes cliniques de Belgique d'organiser, sous les auspices de l'IUPAC, un Symposium sur les Enzymes à Gand en avril 1961. Ce symposium de deux jours et demi connut également un grand succès. La Sous-Commission des Enzymes cliniques fut d'accord de donner une large publicité à ses propositions concernant les nouvelles unités internationales pour les enzymes, et le Président, le Col. M.E. Freeman, a rédigé un rapport sur les propositions en question et l'a fait paraître dans de nombreux journaux médicaux biochimiques.

Le Président de la Section, le Prof. King, a entrepris de rédiger une communication sur la réalisation de ces recommendations pour la conversion des unités d'enzymes établies et la création de nouvelles unités, et ceci a été

publié dans le «Clinica Chimica Acta» et dans les «Proceedings of the Association of Clinical Biochemists». Le Président a également écrit une Histoire de la Commission de Chimie clinique et de la Fédération internationale de Chimie clinique qui a déjà été publiée (voir Annexe de la version anglaise de ce rapport).

E. J. King, Président

V. SECTION DE CHIMIE ANALYTIQUE

RAPPORT SUR LES ACTIVITÉS

Dans sa dernière année de fonctions, le Président désire en tout premier lieu formuler ses sincères remerciements pour l'appui total qu'il a reçu du Comité de Section et de la Section en général.

Les diverses difficultés administratives qui gênèrent la Section pendant les quelques dernières années semblent avoir été résolues à la satisfaction de la plus grande partie des membres. Certains problèmes en dehors du contrôle immédiat de la Section elle-même se sont montrés plus rebelles.

Membres du Comité de Section

Le Président R. Belcher (Royaume-Uni) se retire après la 21e Conférence. Il sera remplacé par le Prof. G. Duyckaerts (Belgique), dont la nomination a été approuvée par la Section et par le Bureau de l'Union.

Les Professeurs L. Gordon (Secrétaire; Etats-Unis), I. P. Alimarin (URSS) et P. W. West (Etats-Unis) continuent comme membres jusqu'en 1963. Les Professeurs G. Charlot (Vice-président; France), F. Feigl (Brésil), G. Kortüm (Allemagne), A. J. Ringböm (Finlande), T. Takahashi (Japon) et A. A. Smales (Royaume-Uni) se retirent cette année. Des élections sont en cours pour déterminer la nouvelle composition du Comité. Le système utilisé, lequel fut indiqué dans le dernier rapport du Président et qui a pour but d'assurer une large représentation, apparaît bon à l'usage.

Réunions et symposia

La majorité de la Section s'est réunie pendant la 20e Conférence de l'Union (1959), et on espère que l'ensemble de la Section se réunira pendant la 21e Conférence (1961). Aucune véritable réunion de Commission n'a eu lieu en 1960.

Le groupe de travail sur la chromatographie des gaz s'est réuni pendant le Symposium sur la Chromatographie des gaz en 1960.

Un Congrès international de Chimie analytique fut organisé à Budapest en avril 1961 par l'Académie des Sciences de Hongrie sous le patronage de l'Union.

Cette réunion fut un grand succès à la fois du point de vue scientifique et du point de vue des relations mutuelles et un vaste champ de la Chimie analytique fut couvert. Des conférences plénières furent faites par les Professeurs I. P. Alimarin (URSS), R. Belcher (Royaume-Uni), G. Charlot (France), C. Duval (France), L. Erdey (Hongrie), L. Gordon (Etats-Unis), J. Heyrovsky (Tchécoslovaquie), K. Jacimirszkii (URSS), W. Kemula (Pologne), E. Schulek (Hongrie), S. Veibel (Danemark), P. W. West (Etats-Unis) et W. F. K. Wynne-Jones (Royaume-Uni).

Il faut rappeler que la médaille Talanta qui est donnée pour des services importants rendus en Chimie analytique, fut décernée au Prof. F. Feigl pendant le Congrès, pour son travail sur le développement des stilliréactions.

La Chimie analytique sera représentée au Congrès de Montréal par un petit symposium sur l'analyse des métaux et des minéraux, la Chimie analytique des métaux non usuels et l'analyse des résidus de pesticides.

La Section juge qu'il est temps que la Chimie analytique soit le sujet principal d'un Congrès officiel de l'Union en liaison avec une Conférence.

Ainsi qu'il est indiqué plus loin dans ce rapport, un Symposium inter-

national de Microchimie organisé par la Metropolitan Microchemical Society sera tenu sous les auspices de l'Union à l'Université de l'Etat de Pennsylvanie (Etats-Unis) peu de temps après la 21e Conférence.

Publications

Six rapports provenant des Commissions, lesquels furent approuvés par la Section pendant la 20e Conférence, furent publiés dans le premier numéro de «Pure and Applied Chemistry», qui parut tardivement un peu avant le commencement de 1961. Ceci est développé plus loin sous la rubrique «Activité des Commissions». Le rapport du Prof. KORTÜM présenté à Munich en 1959 reste non publié. La Section exprime le fervent espoir que le Comité des publications trouvera une formule pour éviter de tels préjudiciables retards dans le futur.

ACTIVITÉ DES COMMISSIONS

V.1 Commission des Réactions analytiques

Les membres titulaires Prof. P.W. WEST (Président, Etats-Unis), Mme T. DUPUIS (France), Prof. J. HOSTE (Belgique), Prof. M. ISHIBASHI (Japon), Mlle Y. RUSCONI (Suisse), Prof. H. WEISZ (Allemagne) et Prof. F. J. WELCHER (Etats-Unis) doivent se retirer cette année, laissant Mr. W.C. JOHNSON continuer comme Secrétaire. Les membres associés Prof. F. FEIGL (Brésil), N. D. CHERONIS (Etats-Unis) et S. VEIBEL (Danemark) se retirent, laissant Dr E. SAWICKI (Etats-Unis), Dr M. PESEZ (France), Dr D. GOLDSTEIN (Brésil), Dr J.R. AMARAL (Brésil) et Dr A.K. MUKHERJI (Etats-Unis) continuer jusqu'en 1963.

La Commission a complété le cinquième rapport sur les réactions et réactifs nouveaux en analyse minérale et le rapport sera prêt pour l'impression après la 21e Conférence. Ce rapport rassemble la documentation récente sur les réactions de caractérisation des substances inorganiques et comprend une information sélectionnée à partir des quatre rapports précédents. Si l'on en juge par les demandes reçues, le rapport est impatiemment attendu par les chercheurs du monde entier.

De nouvelles études des réactions utilisées en analyse minérale peuvent maintenant être reportées. Des études similaires doivent maintenant être dirigées vers les réactions utilisées en analyse organique. Le caractère de la Commission a déjà subi des changements très nets par suite des plans tracés pendant la 20e Conférence en 1959. Après le départ massif des membres de la Commission après la 21e Conférence, la Commission sera réorganisée pour comprendre plus de membres dont la spécialité est du domaine de la Chimie organique.

V.2 Commission des Techniques microchimiques

La composition de la Commission est stable jusqu'en 1962. Les membres titulaires sont: Dr A. STEYERMARK (Président, Etats-Unis), Dr W. SCHÖNIGER (Secrétaire, Suisse), les Docteurs S.A. HÖLZEL, H. SPITZY (Autriche), J. KÖRBL (Tchécoslovaquie), R. LEVY (France), A.J. LLACER (Argentine), R.J. MAGEE (Royaume-Uni). Les membres associés sont: Prof. A.A. BENEDETTI-PICHLER (Etats-Unis) et M. G. INGRAM (Royaume-Uni).

Trois rapports faits par les Commissions actuelle et précédente ont été publiés dans le premier numéro de «Pure and Applied Chemistry» (pages 143, 169 et 171).

Après la publication de «Recommended list of test substances for the

microdetermination of carbon and hydrogen», une liste analogue a été préparée en ce qui concerne la microdétermination de l'azote par les méthodes de DUMAS et de KJELDAHL. Cette liste peut être utilisée pour juger de l'universalité d'une méthode donnée ou d'une modification qui a déjà été décrite ou qui pourra être proposée dans le futur. Elle comprend des composés variés en ce qui concerne la structure, les éléments présents, le pourcentage d'azote. Cette liste a été soumise à la section pour approbation et transmission consécutive.

Les projets de travail de la Commission comportent:

a) extension des listes des substances étalons recommandées pour couvrir tous les éléments et tous les groupes analysés habituellement:

b) recommandations sur l'estimation des méthodes;

c) étude de l'importance de l'enseignement de la microchimie dans les Universités et «Collèges» dans le but de provoquer l'intérêt sur ce sujet et d'assurer un enseignement plus vaste;

d) étude des difficultés rencontrées au cours d'analyses variées et solution de ces difficultés. De tels renseignements doivent être diffusés par tous les moyens.

Un travail récent important de la Commission a été de collaborer avec la Metropolitan Microchemical Society de New York pour l'organisation du Symposium international de Microchimie, lequel aura lieu à l'Université de l'Etat de Pennsylvanie (Etats-Unis) du 13 au 18 août 1961. D'après les communications déjà reçues, cette réunion sera réellement internationale comme représentation et serait extrêmement précieuse pour le développement futur de la microchimie. Il est projeté l'organisation de futurs symposia analogues à des intervalles de 3 à 4 ans.

V.3 Commission de Nomenclature

Les membres titulaires qui doivent se retirer en 1961 sont: les Prof. F. BURRIEL-MARTI (Président, Espagne) et H. MALISSA (Autriche); continuent jusqu'en 1963: Prof. I. M. KOLTHOFF (Etats-Unis) et les Drs A. M. G. MACDONALD (Secrétaire, Royaume-Uni), P. ROCQUET (France) et D. AMBROSE (Royaume-Uni). Les membres associés jusqu'en 1963 sont Prof. I. P. ALIMARIN (URSS), M. ISHIBASHI (Japon) et, jusqu'en 1964, Prof. L. ERDEY (Hongrie), R. PRIBIL (Tchécoslovaquie) et Dr K. H. OBST (Allemagne).

Dr G. VERNIMONT (Etats-Unis) et M. A. H. DODD (Royaume-Uni) ont préparé une version définitive d'une liste simplifiée des termes utilisés en échantillonnage, projet exécuté par les membres de la Commission avant 1959, et cette liste est maintenant prête pour être diffusée.

Les travaux du groupe de travail indépendant sur la nomenclature en chromatographie des gaz sous la présidence du Dr AMBROSE ont continué. Le groupe comprend: Prof. A. I. M. KEULEMANS (Pays-Bas) et les Drs A. T. JAMES (Royaume-Uni), E. KOVATS (Suisse), C. ROUIT (France), E. BAYER (Allemagne) et F. H. STROSS (Etats-Unis). Les recommandations principales sur cette nomenclature ont été publiées dans le premier numéro de «Pure and Applied Chemistry» (p. 177).

La parution de ces recommandations a rencontré une large approbation et elles furent discutées au Symposium de 1960 sur la Chromatographie des gaz. Certains amendements ont été suggérés et sont maintenant en discussion.

Le sujet de la nomenclature de l'acide éthylènediaminetétracétique et des composés analogues a continué à irriter la Commission.

Les informations nécessaires sont maintenant réunies et une décision doit être obtenue à Montréal. Cette question est liée au problème général de la classification en analyse titrimétrique, laquelle est en cours de discussion.

La classification des méthodes en chimie analytique est aussi en cours d'étude.

Une série de recommandations sur la terminologie dans l'extraction par solvants a été préparée en versions russe et anglaise par le Prof. I. P. ALIMARIN et a été distribuée pour commentaires.

Les problèmes de terminologie et des symboles pour l'expression des concentrations dans les travaux analytiques ont été résumés par le Prof. BURRIEL-MARTI en vue d'une discussion ultérieure.

La plupart des sujets mentionnés doivent être épuisés pendant la 21e Conférence.

V.4 Commission de Spectrochimie et autres Méthodes optiques

Les membres titulaires qui restent en fonctions jusqu'en 1963 sont: Dr A.C. MENZIES (Président, Royaume-Uni), M. E. LŒUILLE (Secrétaire, France), Prof. S. MANDELSTRAM (URSS) et Dr B. F. SCRIBNER (Etats-Unis). Doivent se retirer en 1962: Prof. V. FASSEL (États-Unis), Père Dr E. W. SALPETER (Italie). Se retirent en 1961: Prof. G. DUYCKAERTS (Belgique) et H. KAISER (Allemagne) ainsi que les membres associés Dr W. R. BRODE (Etats-Unis) et Prof. M. G. MELLON (Etats-Unis).

Un rapport du Dr MENZIES sur l'étalonnage des longueurs d'ondes et des échelles photométriques des spectrophotomètres non-enregistreurs a été publié dans le premier numéro de «Pure and Applied Chemistry» (p. 147). Le travail de la Commission se développe d'une façon satisfaisante selon les projets mentionnés dans le rapport de la 20e Conférence.

Aucun rapport officiel n'a encore été envoyé par cette Commission à cause de l'absence du Dr MENZIES.

V.5 Commission des Données électrochimiques

Parmi les membres titulaires, Prof. P. DELAHAY (Président-Secrétaire, Etats-Unis), W. KEMULA (Pologne), G. SEMERANO (Italie), N. TANAKA (Japon) et Dr R. BATES (Etats-Unis) se retirent cette année, laissant Prof. G. KORTÜM (Allemagne) et Dr A. HICKLING (Royaume-Uni) continuer jusqu'en 1963. Parmi les membres associés, Prof. M. ISHIBASHI (Japon) et J. PROSZT (Hongrie) se retirent cette année, laissant Prof. G. CHARLOT (France) et les Drs H. GERISHER (Allemagne) et P. ZUMAN (Tchécoslovaquie) continuer jusqu'en 1963. Dr A. PERRIN (Australie) sert comme membre associé jusqu'en 1965. Les membres associés de la Commission d'Electrochimie de la Section de Chimie physique sont Dr M. POURBAIX (Belgique), Prof. G. VALENSI (France) et Dr W. J. HAMER (Etats-Unis).

Quatre domaines sont couverts par les activités de la Commission:

a) constantes de dissociation des acides et des bases faibles et données polarographiques;
b) la définition du pH dans des milieux variés;
c) le choix d'électrodes de référence convenables dans les solvants non-aqueux et les sels fondus;
d) la nomenclature en chimie électroanalytique.

Une compilation minutieuse des constantes de dissociation des acides organiques préparée par le Prof. G. KORTÜM est en cours de publication. Le Dr PERRIN examine maintenant les constantes de dissociation des acides inorganiques et des bases organiques et inorganiques. Il est projeté un travail sur les constantes de dissociation et d'ionisation des électrolytes faibles dans les solvants non-aqueux et les sels fondus.

Une liste de données polarographiques a été publiée sous forme d'un livre par le Prof. SEMERANO et ses collaborateurs et la suite de ce travail est projetée.

Il est espéré que l'accord sera obtenu à Montréal sur la forme des futures compilations.

Les recommandations pour une définition effective du pH ont été préparées conjointement par cette Commission et par la Commission d'Electrochimie et furent publiées dans le premier numéro de «Pure and Applied Chemistry» (p. 163). Le Dr BATES continue ce travail pour les milieux non-aqueux.

Les projets prévoient la préparation de recommandations pour des électrodes de référence convenables en milieux non-aqueux et dans les sels fondus; ce sujet est d'une importance urgente, étant donné le grand nombre des travaux actuels dans ces milieux.

Une nomenclature des méthodes électrochimiques d'analyse a été proposée par les Prof. DELAHAY, CHARLOT et LAITINEN et a été largement diffusée pour être commentée. Un travail futur de nomenclature est projeté.

En conclusion, la Commission a été active dans plusieurs domaines où un accord international est le plus souhaitable. Cette activité n'a en aucune façon fait double emploi avec celle de la Commission d'Electrochimie de la Section de Chimie physique.

V.6 Commission des Données d'Equilibre

Les membres titulaires Prof. G. SCHWARZENBACH (Président-Secrétaire, Suisse), W. FEITKNECHT (Suisse), D. N. HUME (Etats-Unis), H. M. N. H. IRVING (Royaume-Uni), Dr J. C. HINDMAN (Etats-Unis) et I. LEDEN (Suède) se retirent cette année. Les membres associés Prof. T. TAKAHASHI (Japon) et K. B. YATSIMIRSKII (URSS) se retirent aussi; continuent jusqu'en 1963: Prof. J. BJERRUM (Danemark), A. E. MARTELL (Etats-Unis); A. RINGBOM (Finlande) et L. G. SILLÉN (Suède).

Cette Commission a été l'une des plus productives de l'Union et il est souhaitable que sa composition ne soit pas complètement changée en 1961. Depuis 1956, tout le travail de la Commission a été effectué par correspondance, mais cette année la Commission se réunira dans le but de poursuivre son travail plus rapidement.

La valeur des tables de constantes de stabilité préparées par la Commission a été universellement appréciée, et la première partie (Organic Ligands), publiée par la Chemical Society a été épuisée en quelques mois. De plus beaucoup de données nouvelles sont apparues dans la littérature. Le manuscrit d'une seconde édition comprenant les parties I et II (Inorganic Ligands) est maintenant en préparation. La dernière partie a été rassemblée par le Prof. SILLÉN, qui a adressé d'importantes listes supplémentaires de constantes à tous les membres des Commissions. La partie I est complétée par le Prof. MARTELL avec l'aide du Prof. SCHWARZENBACH et du Dr ANDEREGG. La parution de cette nouvelle édition est impatiemment attendue par tous ceux auxquels la précédente édition a paru précieuse.

Une compilation critique des données concernant la solubilité des hydroxydes métalliques est en préparation par le Prof. FEITKNECHT et sera soumise à l'approbation en 1961.

Conclusion

Le travail de la Section apparaît comme ayant progressé d'une façon satisfaisante au cours de ces deux dernières années. Les efforts faits à Munich en 1959 pour augmenter l'efficacité du travail de la Section ont été couronnés de succès et l'expérience montre la voie de quelques réformes secondaires.

En conclusion, le Président souhaite à son successeur, Prof. DUYCKAERTS, tout succès dans la direction du travail de la Section.

R. BELCHER, Président

V. SECTION DE CHIMIE ANALYTIQUE

RAPPORT SOMMAIRE FINAL

du Président de Section 1959–61

Dans ce dernier rapport le Président désire rappeler combien il a apprécié l'appui chaleureux qu'il a reçu du Comité de la Section et de la Section en général.

Les diverses difficultés administratives qui ont gêné la Section pendant les toutes dernières années ont été résolues à la satisfaction d'au moins la majorité des membres. Certains problèmes en dehors du contrôle immédiat de la Section se sont montrés plus difficiles à résoudre.

Membres du Comité de Section

Le Président R. BELCHER (GB) s'est retiré après la XXIe Conférence. Le Prof. G. DUYCKAERTS (Belgique) qui avait été élu à l'unanimité par la Section devait le remplacer. Malheureusement, le Prof. DUYCKAERTS fut obligé de renoncer pour des raisons de santé. Pendant la XXIe Conférence, le Prof. H. MALISSA (Autriche) fut unanimement élu à sa place. Des élections avaient eu lieu avant la Conférence: les Prof. R. BELCHER (GB) et G. CHARLOT (France) furent élus pour 2 ans, le Prof. BELCHER comme Vice-Président. Les Prof. P. DELAHAY (USA), W. FISCHER (Allemagne), R. PRIBIL (Tchécoslovaquie) et N. TANAKA (Japon) furent élus pour 4 ans (1961–1965). Pendant la XXIe Conférence, le Prof. L. GORDON (USA), Secrétaire de la Section, a présenté sa démission, parce que sa récente nomination comme Doyen des études supérieures du Case Institute of Technology ne lui laisse plus le temps nécessaire aux affaires de la Section. Il fut proposé de demander au Dr P.N. DEGENS (Pays-Bas) d'accepter le secrétariat et le Dr DEGENS a accepté. Les Prof. I.P. ALIMARIN (URSS) et P.W. WEST (USA), continuent jusqu'en 1963.

Mode d'élection du Comité de Section

Le mode d'élection indiqué dans les Comptes rendus de la XXe Conférence (p. 262) a été maintenant essayé à l'occasion des élections précédentes. A la suite de ces élections, il fut confirmé avec l'addition suivante: il est permis l'élection de trois membres sans considération de répartition géographique, mais il est décidé qu'aucune région représentée officiellement ne peut avoir ainsi plus d'un membre supplémentaire.

Congrès et symposia

L'ensemble de la Section s'est réuni pendant la XXIe Conférence (1961). Aucune réunion officielle de Commission ne s'est tenue en 1960.

Le groupe de travail sur la Chromatographie des gaz s'est réuni pendant le Symposium sur la chromatographie des gaz à Edimbourg en 1960.

Un Congrès international de Chimie analytique a été organisé à Budapest en avril 1961 par l'Académie hongroise des Sciences sous le patronage de l'Union. Ce congrès fut très réussi à la fois du point de vue scientifique et du point de vue des relations internationales et un grand domaine de la Chimie analytique fut couvert. Des conférences plénières furent données

par les Prof. I.P. ALIMARIN (URSS), R. BELCHER (GB), G. CHARLOT (France), C. DUVAL (France), L. ERDEY (Hongrie), L. GORDON (USA), J. HEYROVSKY (Tchécoslovaquie), K. JACIMIRSKII (URSS), W. KEMULA (Pologne), E. SCHULEK (Hongrie), S. VEIBEL Danemark), P.W. WEST (USA) et W.F.K. WYNNE-JONES (GB).

Il doit être rappelé que la médaille Talanta, laquelle est donnée pour des services exceptionnels à la Chimie analytique, fut attribuée au Prof. F. FEIGL pendant le Congrès, pour son travail sur l'utilisation des «Spot tests».

La chimie analytique fut représentée au Congrès de Montréal par de petits symposia sur l'analyse des métaux et des minéraux, sur la chimie analytique des métaux moins communs et sur l'analyse des résidus de pesticides.

La Section de chimie analytique estime que le moment est venu où la chimie analytique doit être le principal sujet d'un Congrès officiel de l'Union tenu en même temps qu'une Conférence.

Un Symposium international de microchimie organisé par la Metropolitan Chemical Society sous les auspices de l'Union s'est tenu à l'Université d'Etat de Pensylvanie (USA) peu de temps après la XXI[e] Conférence, du 13 au 18 août 1961. Cette réunion a eu un succès marqué en permettant les contacts entre les scientifiques américains et européens. Des conférences plénières furent faites par les Prof. H. LIEB (Autriche), A.A. BENEDETTI-PICHLER (USA), R. BELCHER (GB) et N. CHERONIS (USA).

La Section remercie vivement les organisateurs de cette réunion.

En 1962 un Symposium international de chimie analytique se tiendra à Birmingham (GB) sous les auspices de l'Union pour célébrer le 70[e] anniversaire du Prof. F. FEIGL (Brésil), qui a été un membre dirigeant de la Section de Chimie analytique pendant de nombreuses années.

Un symposium de chimie analytique se tiendra à Londres en 1963 comme une partie du Congrès de l'Union et le Comité de Section est invité à proposer des sujets.

Le Prof. KEMULA de la délégation polonaise a proposé qu'un Congrès de chimie analytique se tienne à Varsovie en 1963, à la suite du symposium de Londres. Le Comité craint cependant que le Congrès polonais projeté vienne ainsi en compétition plutôt qu'en complément et propose que ce Congrès ait lieu plus tard (en 1964 au plus tôt). Le Comité admet avec faveur l'idée qu'un Congrès entier soit consacré à la chimie analytique comme le fut celui de Lisbonne en 1956.

Une conférence internationale de spectroscopie se tiendra à l'Université de Maryland pendant la période du 18 au 22 juin 1962. La conférence est intitulée X[e] Colloquium Spectroscopicum Internationale et a demandé le patronage de l'Union.

Publications

Les divers rapports de Section qui furent complétés après la XX[e] Conférence et qui furent annoncés dans les Comptes rendus (p. 271) parurent finalement dans «Pure and Applied Chemistry» pendant la première moitié de 1961. Parmi eux figure l'importante compilation des constantes de dissociation des acides organiques en solution aqueuse préparée par le Prof. KORTÜM et ses collaborateurs. La publication des tables de données sur la spectrophotométrie d'absorption préparées par la Commission des Données optiques sous la direction du Prof. DUYCKAERTS est attendue dans les mois à venir.

La Section adresse ses remerciements sincères à ses membres qui ont préparé tous ces rapports.

V.1 Commission des Réactions analytiques

Pendant la XXIe Conférence, la Commission fut réorganisée, car tous les membres titulaires, excepté Mr. W.C. JOHNSON (GB), arrivent à la fin de leur mandat.

Les nouveaux membres de la Commission sont: Prof. S. VEIBEL, Président (Danemark), Mr. W.C. JOHNSON, Secrétaire (GB), Prof. N.D. CHERONIS (USA), F. FEIGL (Brésil), F.J. WELCHER (USA), et Drs M. JURECEK (Tchécoslovaquie). A.K. MUKHERJII (USA), M. PESEZ (France). Membres associés: Drs J.R.A. AMARAL (Brésil), V. ANGER (Austriche), D. GOLDSTEIN (Brésil), E. SAWICKI (USA) et W.I. STEPHEN (GB). Le mandat des Drs AMARAL et GOLDSTEIN se terminent en 1963; tous les autres sont nommés pour la période 1961–65.

Pendant la conférence, le 5e rapport sur les nouveaux réactifs et réactions en analyse inorganique fut discuté; le rapport final sera prêt à être publié pour la fin de 1961. Ce rapport rassemble la documentation mise à jour concernant les réactions qualitatives pour les substances minérales et inclut une documentation sélectionnée extraite des quatre précédents rapports. Des demandes reçues. il apparaît que ce rapport est impatiemment attendu par les chercheurs du monde entier.

D'autres études de réactions utilisées en analyse minérale peuvent maintenant être différées. Des études analogues seront maintenant dirigées vers les réactions utilisées en analyse organique. Les nouveaux membres de la Commission ont été désignés dans ce but.

Le Prof. FEIGL a préparé un plan pour la compilation en vue d'un rapport sur les réactions qualitatives des composés organiques. Ce plan a été approuvé par la Commission et le travail est maintenant en train.

V.2 Commission des techniques microchimiques

Les membres de la Commission seront: Dr S. STEYERMARK, Président (USA). Dr W. SCHÖNIGER, Secrétaire (Suisse); comme membres titulaires jusqu'à 1966: Drs S. HÖLZEL (Autriche), J. KÖRBL (Tchécoslovaquie), R. LÉVY (France) et comme membres titulaires jusqu'en 1963: Drs A. LLACER (Argentine), R. MAGEE (GB) et H. SPITZY (Autriche). Membres associés: M. G. INGRAM (GB) jusqu'en 1966 et Prof. A.A. BENEDETTI-PICHLER (USA) jusqu'en 1963. Drs CEL'MAN (URSS) et VECERA (Tchécoslovaquie) sont proposés comme membres associés.

Les séries de recommandations sur des substances étalons pour l'analyse microchimique élémentaire ont été poursuivies et des recommandations pour la détermination de l'azote par les méthodes de DUMAS et de KJELDAHL et pour la détermination des halogènes et du soufre ont été préparées et sont prêtes pour la publication.

Une proposition a été faite à la Commission par la Österreichische Gesellschaft für Mikrochemie et par la Metropolitan Chemical Society pour que le symbole *e* soit utilisé pour désigner 10^{-15} unité dans la nomenclature des masses, volumes, etc... Ceci fut proposé en honneur du Prof. EMICH. La proposition fut approuvée par la Commission et il a été prévu de consulter le Comité de la Section et d'autres sections.

La Commission a l'intention de rassembler dans un rapport les causes d'erreur en microanalyse élémentaire et en analyse fonctionnelle, afin que cette documentation soit utilisable en général dans tous les laboratoires de microanalyse.

Un groupe d'études sur les problèmes de microanalyse minérale sera constitué par certains membres de la Commission.

V.3 Commission de nomenclature

Le Prof. F. Burriel-Marti (Espagne) continue comme Président jusqu'en 1963. Le Dr D. Ambrose (GB) accepte le Secrétariat jusqu'en 1963 à la place du Dr Mlle A.M.G. MacDonald qui démissionne. Les membres titulaires jusqu'en 1963 seront: les Prof. I.P. Alimarin (URSS), G. Charlot (France), L. Erdey (Hongrie), R. Přibil (Tchécoslovaquie), E.B. Sandell (USA) et Dr E. Bayer (Allemagne).

La liste simplifiée des termes concernant l'échantillonnage préparée par le Dr Wernimont (USA) et Mr. A.H. Dodd (GB) est maintenant sous sa forme définitive et sera prête pour la publication en 1962.

Le groupe de travail indépendant sur la nomenclature en chromatographie gazeuse dirigé par le Dr Ambrose a étudié des amendements aux propositions faites et publiées dans «Pure and Applied Chemistry», vol. I, p. 177.

Un intérêt a été accordé aux méthodes d'expression des concentrations en chimie analytique, mais il a été décidé de ne pas pousser plus loin cette étude.

Le sujet de la nomenclature concernant l'acide éthylène-diaminetétracétique a continué à préoccuper cette Commission.

Considérant la recommandation de «complexan» plutôt que complexon ou chélon pour désigner les acides polyaminocarboxyliques et les composés analogues, faite par le Comité de la Section en 1956, plusieurs objections furent faites. Le sujet fut en conséquence discuté par la Commission et par la Section entière pendant la XXIe Conférence et les recommandations suivantes furent unanimement approuvées:

1° Les termes tels que complexon, complexan, séquestrène, versène, trilon, chélon et autres pour désigner les acides polyaminocarboxyliques et les réactifs analogues doivent être abandonnés. La pratique universelle pour désigner chaque composé: EDTA, NTA, CDTA, etc. doit être adoptée.

2° Les méthodes de titrage qui utilisent un agent complexant quel qu'il soit devraient être désignées par «titrages compleximétriques». Une classification plus détaillée n'est ni nécessaire ni désirable. Quand un réactif titrant déterminé doit être désigné, la méthode de titrage est indiquée comme «titrage compleximétrique avec l'EDTA, l'oxine, etc.».

Des recommandations particulières seront faites pour les autres types de titrage dans l'avenir. Il fut entendu que l'usage des termes tels que acidimétrie, alcalimétrie, iodimétrie, iodométrie, thiosulfatométrie, permanganométrie, etc. n'était ni nécessaire, ni désirable. Quelques-uns de ces termes ont des significations opposées dans des pays différents.

La Section de Chimie analytique recommandera l'adoption finale de la terminologie la plus simple possible avant la réunion de l'Union qui doit se tenir à Londres en 1963.

Il fut décidé de reconstituer la Commission en vue d'inclure des membres qualifiés pour traiter de la nomenclature de l'extraction par solvants et les membres précédemment indiqués furent désignés dans ce but. Ce projet doit être terminé dans 2 ans.

V.4 Commission des méthodes spectrochimiques et autres méthodes optiques

Le Dr A.C. Menzies, Président (GB), et M.E. Lœuille, Secrétaire (France), les Prof. S. Mandelstam (URSS) et V. Fassel (USA) et le Dr B.F. Scribner (USA) continuent jusqu'en 1963; le Dr E.W. Salpeter (Italie) continue jusqu'en 1962. Le Prof. H. Kaiser (Allemagne) a été réélu jusqu'en 1965.

Les Drs L.S. BIRKS (USA), G. POMEY (France), H. GUYER (Suisse), H. SVEJDA (Autriche) et G. KORTÜM (Allemagne) sont invités à faire partie de la Commission.

Les réunions tenues durant la XXIe Conférence ne prirent pas de décisions du fait de l'absence de quelques membres absents pour raison de santé. Un modèle concis pour la description et la publication des méthodes optiques et spectrographiques d'analyse a été distribué et a reçu l'approbation unanime de la Commission.

Des progrès satisfaisants ont été faits en ce qui concerne les projets suivants: 1° Nomenclature, symboles et unités particulièrement pour la spectroscopie analytique d'émission; 2° Compilation critique de la validité des échantillons étalons; 3° Compilation de la sensibilité de détection caractéristique d'une combinaison particulière des conditions d'utilisation de la source d'excitation spectrale. Une proposition pour la normalisation des méthodes de caractérisation du spectre d'émission de fluorescence a été reçue du Comité de la Section et a été donnée à la Commission. Une enquête sera faite concernant l'état présent des raies d'émission étalons pour la région de l'ultra-violet sous vide.

La possibilité de réunir une documentation critique concernant les erreurs des tables de longueurs d'onde doit être examinée, car il est bien connu que certaines tables contiennent des erreurs dans la caractérisation des raies.

V.5 Commission des données électrochimiques

Le Prof. P. DELAHAY (USA) continue comme Président-Secrétaire jusqu'en 1963. Les membres titulaires jusqu'en 1965 sont les Prof. G. KORTÜM (Allemagne), I.M. KOLTHOFF (USA), W. KEMULA (Pologne), N. TANAKA (Japon) et les Drs Mme J. BADOZ-LAMBLING (France) et H. GERISCHER (Allemagne); le Dr A. HICKLING continue jusqu'en 1963. Les membres associés jusqu'en 1963 sont: le Prof. G. CHARLOT (France) et le Dr P. ZUMAN (Tchécoslovaquie).

Les membres associés représentant la Commission d'Electrochimie de la Section de Chimie physique sont: Prof. G. VALENSI (France) et Drs M. POURBAIX (Belgique) et W.J. HAMER (USA). Sont élus comme membres associés jusqu'en 1965 le Dr R. BATES (USA), le Prof. H.A. LAITINEN (USA), le Dr R. A. ROBINSON (USA), le Dr E. VIANELLO (Italie) et le Dr A. PERRIN (Australie).

La compilation des constantes de dissociation des acides organiques préparée par le Prof. KORTÜM a été publiée. Ce travail important sera continué pour les acides minéraux et pour les bases minérales et organiques par le Dr PERRIN. Le plan de cette compilation sera le même que celui utilisé par le Prof. G. KORTÜM.

Le rapport de nomenclature et normalisation des mesures de pH a été publié, en anglais, dans «Pure and Applied Chemistry», vol. I, p. 163; les versions française, italienne et japonaise paraîtront ultérieurement.

Le rapport sur la classification et la nomenclature des méthodes électroanalytiques a été publié en anglais, en français, en italien et en japonais: il sera révisé pour tenir compte des commentaires reçus. Il sera ensuite soumis pour publication dans «Pure and Applied Chemistry».

La compilation des données polarographiques est continuée par le Prof. SEMERANO et le Dr VIANELLO avec l'appui de la Commission.

Un Sous-Comité a été constitué pour examiner d'une façon critique les méthodes de détermination des données dans les solvants non-aqueux. Une étude analogue sera faite pour les sels fondus.

Une compilation des paramètres cinétiques concernant les phénomènes aux électrodes qui a été préparée par le Prof. TANAKA a été soumise à la Commission d'Electrochimie de la Section de Chimie physique. dans le but d'éviter la dispersion des efforts entre les deux commissions.

V.6 Commission des Données d'équilibres

Le mandat de membres titulaires est arrivé à son terme à la 21e Conférence. Les nouveaux membres de la Commission seront: Prof. D.N. HUME, Président-Secrétaire (USA), avec comme membres titulaires: Prof. L.G. SILLÉN (Suède), J. BJERRUM (Danemark), A.E. MARTELL (USA), H. FREISER (USA), K.B. YATSIMIRSKI (URSS) et Drs J.C. HINDMAN (USA) et D. DYRSSEN (Suède). Membres associés: Prof. W. FEITKNECHT (Suisse), G. SCHWARZENBACH (Suisse), A.J. RINGBOM (Finlande), H.M.N.H. IRVING (GB), T. TAKAHASHI (Japon) et Dr I. LEDEN (Suède). Le mandat de Prof. HUME et Dr HINDMAN finit en 1963; les autres sont pour la période 1961–65.

La valeur des Tables de constantes de stabilité qui ont été préparées par cette Commission est universellement reconnue et la première partie de la première édition publiée par la Chemical Society est épuisée depuis quelques mois. Une seconde édition des deux parties est en préparation. Pour la partie inorganique des tables, le Prof. SILLÉN a préparé et distribué des listes supplémentaires de constantes. Il a aussi donné une liste de données sur les équilibres d'oxydo-réduction qui peut être incorporée comme appendice dans les tables de constantes de stabilité. Pour la partie organique des tables, le Prof. MARTELL a préparé une édition révisée, qui est beaucoup plus importante que la première édition et qui est complète jusqu'à 1960. Les manuscrits des deux publications seront prêts pour la publication en 1962 et il est espéré qu'ils seront publiés en un seul volume.

La liste des valeurs sélectionnées de produits de solubilité qui a été préparée par le Prof. FEITKNECHT a été approuvée par la Commission et sera prête pour la publication fin 1961.

Conclusion

En général le travail de la Section à travers ses diverses commissions a bien progressé ainsi qu'il ressort du nombre de rapports qui ont été publiés dans le nouveau journal «Pure and Applied Chemistry». Les diverses mesures prises pour augmenter l'efficacité du travail de la Section portent maintenant leurs fruits.

Le Président exprime ses remerciements à tous les membres de la Section qui, par leur activité, ont contribué aux progrès réalisés. Pour terminer, il souhaite à son successeur, le Prof. H. MALISSA, tout le succès dans sa future direction du travail de la Section.

R. BELCHER, Président

VI. SECTION DE CHIMIE APPLIQUÉE

RAPPORT SUR LES ACTIVITÉS

Objectifs de la Section

Bien que ce document doive relater le travail de la Section durant les deux dernières années, il est bon de faire tout d'abord quelques commentaires sur le développement de la Section depuis sa création, il y a exactement dix ans.

Durant cette période, la Section a considérablement élargi son champ d'activité et son influence s'est accrue. Etant donné qu'elle se compose de Divisions représentant la plupart des industries ou groupes d'industries, cet accroissement s'est traduit par une augmentation du nombre de ces Divisions (9 au total actuellement) et par des demandes d'en créer d'autres. Ce développement encourageant et vivement désirable a atteint maintenant un stade où il menace de causer à l'Union des embarras financiers. C'est pourquoi il est compréhensible que cette question ait été étudiée d'une façon très approfondie, afin de trouver comment un juste équilibre pourrait être établi entre le développement croissant de l'activité de la Section et l'aide financière que l'Union peut lui accorder. En outre, si le développement de la Section de Chimie appliquée doit tenir compte des désirs de l'industrie, il est évident que l'industrie elle-même sera obligée de lui accorder également un support financier plus important. C'est pourquoi nous espérons que la plus grande publicité sera donnée à l'appel de fonds que le Trésorier de l'Union a lancé dans ce but.

L'expérience acquise durant les dix années d'existence de la Section a démontré la diversité des besoins des différentes industries. Cette expérience a permis de se rendre mieux compte des limites dans lesquelles de telles activités peuvent être conciliées avec les objectifs de l'Union. Ceci nous a conduit à préparer un document définissant plus clairement les objectifs et fonctions de la Section et de ses Divisions dans le cadre de l'Union. Les caractéristiques essentielles de ce document, préparé en collaboration avec les Présidents de Divisions, sont inclues dans ce rapport.

Fonctions des Divisions et Commissions s'y rattachant

La Section de Chimie appliquée embrasse tous les objectifs que l'Union s'est fixés, c'est-à-dire «l'avancement de la chimie sous tous ses aspects», y compris l'organisation de conférences, de congrès ainsi que des discussions. Néanmoins, le but essentiel de cette Section est de rendre service à l'industrie avec tous les moyens par lesquels la chimie peut favoriser la compréhension entre pays et aider le commerce international.

C'est pourquoi il n'est pas surprenant que la structure de cette Section de Chimie «appliquée» soit quelque peu différente de celle des autres Sections, s'occupant de Chimie «pure». La première diffère des secondes par le fait qu'elle comprend des Divisions, chacune d'elles servant le mieux possible une, parfois plusieurs industries.

Distribution géographique des représentants

L'activité de ces Divisions couvre un vaste domaine. Elle s'étend des problèmes d'une nature hautement chimique jusqu'à ceux paraissant aussi simples que la signification des termes techniques. Ils peuvent être subdivisés comme suit:

1° L'établissement d'accords internationaux avec l'industrie privée sur tous les problèmes s'occupant des matières premières et produits finis. De telles questions incluent les symboles, la terminologie, les unités, les abréviations, la représentation de données et la caractérisation des étalons (substances et réactions).

2° L'établissement d'accords internationaux sur les méthodes d'analyse chimique et autres contrôles des matières et produits de l'industrie. Ceci suppose habituellement la comparaison d'une substance standard, dans un certain nombre de laboratoires sélectionnés, à l'aide de deux ou trois méthodes généralement admises. Les résultats permettent de choisir une méthode et de la recommander à l'industrie pour emploi sur le plan international.

3° L'examen et la recommandation d'autres problèmes qui intéressent l'industrie et ne peuvent être étudiés d'une façon appropriée qu'à l'échelon international.

Quelques Divisions peuvent avoir – et souvent ont – des relations très étroites avec d'autres Divisions concernant certains aspects de leurs travaux. Dans de tels cas, il est bon de former des Commissions mixtes. En fait, des Commissions mixtes peuvent également être créées entre les Divisions et d'autres Sections.

Pour des raisons d'économie, il était d'usage jusqu'ici – lorsqu'il était possible de le faire – pour les membres des Comités de Divisions de se constituer eux-mêmes (avec des membres associés, si nécessaire) en Sous-Comités pour étudier certains problèmes mentionnés sous point 1) ci-dessus. Les Divisions suivantes ont adopté cette pratique: Plastiques et hauts Polymères, Revêtements de Surface, Matières grasses, Pâte, Papier et Carton, et Toxicologie et Hygiène industrielle.

Pour les analyses de chimie appliquée (point 2), il a souvent été justifié de former des Commissions. Trois Divisions ont établi, dans ce but, les Commissions suivantes:

Divisions	*Commissions*
Bromatologie	Additifs alimentaires
	Oligoéléments dans l'Alimentation
Fermentation	Détermination des Huiles fusel
	Caractérisation des Levures séchées
Pâte, Papier et Carton	Analyses de la Cellulose

La Division de Toxicologie et d'Hygiène industrielle s'intéresse également aux analyses et les emploie pour l'établissement du taux de concentration maximum tolérable des substances toxiques industrielles dans l'atmosphère et dans les milieux biologiques. Le Comité de cette Division est en train d'étudier les méthodes de détermination, mais sans former de Commission.

Le point 3, qui traite de problèmes plus vagues et moins facilement définissables, concerne particulièrement les Divisions qui ont des intérêts multiples dans diverses industries, telles que celles des «Eaux d'Egout et Eaux industrielles résiduaires» et les «Pesticides». La première a procédé à une étude et fait un rapport sur le réemploi de l'eau dans l'industrie, une contribution à la solution du problème des effluents, alors que la seconde – à part ses essais en vue de rationaliser les méthodes de détection et de mesure des résidus de pesticides (qui devraient être compris sous point 2) – s'occupe des recommandations sur le contrôle législatif des pesticides.

Modification de la structure

Dans une organisation vraiment internationale, il est très important qu'une représentation internationale appropriée soit assurée dans les différents comités. D'autre part, il est également essentiel que l'autorité des

membres et officiers des Comités soit reconnue afin d'assurer que les personnalités les mieux informées soient appelées à discuter et décider de ces problèmes. Ces deux exigences sont souvent difficiles à concilier. Etant donné que le Président a déjà fait mention de cette question dans son rapport, je n'ai pas besoin ici de m'étendre plus sur ce sujet. Qu'il suffise de dire que, dans la Section de Chimie appliquée, il doit y avoir, parmi les membres des Comités, prépondérance des pays très industrialisés. Les autres pays, toutefois, doivent assurer une représentation par la désignation de délégués nationaux, invités à prendre part – sans droit de vote – aux discussions.

Organisation de la Section découlant de son importance actuelle et de son accroissement futur éventuel

Ainsi que nous l'avons dit, l'accroissement naturel de la Section de Chimie appliquée a déjà provoqué des répercussions financières; il entraîne également des questions d'organisation. Des changements éventuels dans la structure de la Section ont, en conséquence, été il y a quelque temps l'objet de discussions et ont conduit aux suggestions mentionnées dans le «Bulletin d'Information» N° 11, pages 31 et 32. Ce projet provisoire a été largement diffusé, tout d'abord parmi les membres de la Section, puis les membres de l'Union et, plus récemment, par l'intermédiaire du Secrétaire général, les différents organismes adhérents, en les priant de faire des commentaires à ce sujet. Nous espérons donc qu'un résumé des différents commentaires, sur la meilleure manière dont la Section de Chimie appliquée pourrait servir les besoins de l'industrie, pourra être préparé, pour discussion lors de la Conférence de Montréal (voir p. 176).

RAPPORTS DE CHAQUE DIVISION

Les rapports suivants sont surtout des résumés ne comprenant pas les questions concernant la composition des Comités de Divisions ou de Commissions. Ces renseignements sont donnés aux pages 60–70.

VI.1 Bromatologie

Le Comité de cette Division comprend en ce moment deux Commissions: Oligoéléments dans l'Alimentation et Additifs alimentaires. La première est sur le point de terminer sa tâche, alors que la seconde, qui a débuté sous forme d'un comité ad hoc chargé de rapporter sur le sujet général des additifs alimentaires, a vu ses tâches s'élargir lorsqu'elle devint une Commission. Cet organisme est maintenant chargé d'une étude des méthodes analytiques pour les additifs alimentaires.

La *Commission des Oligoéléments dans l'Alimentation* s'est réunie à Londres le 24 septembre afin de discuter des méthodes de détermination du plomb et du mercure. Le Prof. REITH a résumé le travail de sa Commission dans les termes suivants:

«Il fut question de quelques problèmes sur la détermination des traces de plomb et de mercure dans les aliments. A la suite de cette discussion, un nouveau projet sur la détermination du mercure a été distribué parmi les membres avec des échantillons, afin de leur permettre de procéder à des analyses comparatives. De nouveaux projets sur la détermination du plomb, tenant compte des remarques formulées lors de la dernière réunion, seront également bientôt distribués. On pense que cette Commission pourra achever son travail lors de sa prochaine séance.»

La *Commission des Additifs alimentaires* s'occupe de réunir des renseigne-

ments dans divers pays sur les méthodes d'analyse des additifs alimentaires. Le Prof. A.C. FRAZER espère avoir d'ici mai 1961 la plupart de ces informations. La Commission se réunira ensuite en Europe afin de décider comment ces méthodes peuvent être présentées sous la forme la plus rationnelle.

VI.2 Division de Fermentation

Depuis la Conférence à Munich en 1959, des progrès considérables ont été réalisés par les deux Commissions de cette Division.

La *Commission A* s'est réunie à Zurich en août 1960, ce qui a permis à de nombreuses personnalités travaillant dans le domaine de la détermination des huiles fusel de se rencontrer pour la première fois. Chaque délégué a décrit les huiles fusel qu'il a étudiées (selon le type de matière fermentée) et la technique employée.

On est arrivé à la conclusion d'un accord général sur les résultats obtenus par les divers chercheurs, et il a paru que la chromatographie en phase gazeuse pourrait probablement – sous certaines conditions – être le meilleur moyen d'analyser quantitativement les constituants du fusel dans de petits volumes de matières fermentées.

La Commission a espéré se réunir et, si possible, terminer son travail lors d'une séance à Helsinki en août 1961, mais si l'IUPAC ne peut accorder de subsides à cet effet, cela pourrait signifier que la Commission ne sera pas en mesure de terminer ses travaux avant 1962.

La *Commission B* sur les levures séchées s'est également réunie à Zurich en août 1960 et espère finir sa tâche à fin 1961. Quelques divergences d'opinion ayant surgi concernant les définitions, on espère qu'elles ont pu être résolues entre-temps. La Commission a discuté d'un certain nombre d'analyses comparatives et est arrivée à se mettre d'accord concernant les étalons.

La Division désire que le travail futur s'achemine dans la direction d'une étude du problème de l'utilisation des déchets biologiques, en coopération avec la Division des Eaux d'Egout et Eaux industrielles résiduaires, également en faveur de ce projet. On pense que le meilleur moyen de le faire est de former une Commission mixte des deux Divisions. On espère qu'il sera possible de réunir à cet effet les deux Divisions lors de la Conférence et du Congrès de l'IUPAC à Londres en 1963.

VI.3 Division de Matières grasses

Depuis sa séance à Munich en 1959, cette Division s'est réunie à Bari (Italie) les 11 et 12 octobre 1960.

Les points suivants sont pris parmi ceux faisant l'objet d'une étude approfondie: l'indice BÖHME; la détermination spectrophotométrique de la couleur des huiles (la méthode précédente doit être modifiée à la suite du travail d'un observateur français); une nouvelle méthode d'estimation de l'alcali caustique libre dans les savons; la courbe de solidification des graisses (ceci à étudier en collaboration avec l'Organisation internationale des Fabricants de Chocolat); la détermination spectrophotométrique ultraviolette des acides gras polyinsaturés; l'indice de carbonyle (celui-ci est retenu sous le nom «l'indice de benzidine» et sera normalisé); la détermination des monoglycérides (la méthode a été adoptée et sera normalisée).

Le travail concernant ces problèmes est discuté sous la supervision des différents membres de la Division, quelques-uns en collaboration avec d'autres organismes, tels que le Comité international de la Détergence (CID), l'Association internationale des Fabricants de Savon (AIS) et l'Organisation internationale de Normalisation (ISO).

Au sujet des tourteaux dans les huiles de lin, un Sous-Comité s'est réuni

conjointement avec un Sous-Comité de l'Association internationale des Fabricants d'Huile (Amsterdam, novembre 1959). Au cours de cette réunion, un certain nombre d'analyses furent acceptées et ceci forme la base d'un rapport de M. W. V. LEE (Secrétaire des deux Comités), daté du 29 août 1960. M. LEE a pris également part à une réunion du Comité d'Analyse de la Division des Revêtements de Surface à Londres en septembre 1960, lorsque les méthodes d'analyse, etc., d'un intérêt commun aux deux Divisions furent discutées, en particulier en relation avec les huiles siccatives. La poursuite à l'avenir d'une collaboration entre les deux Divisions est souhaitable.

En ce qui concerne l'estimation de la teneur en eau des huiles, il n'y a rien de particulier à signaler ici, mais une nouvelle méthode doit être établie, compte tenu des observations de certains membres de la Division.

Les sujets qui ont été retenus pour une étude future comprennent la détermination chromatographique des glycérides dans l'huile brute, des méthodes d'échantillonnage des huiles et graisses, la dilatométrie et les pertes dans le raffinage.

«Les méthodes normalisées pour l'analyse des huiles et graisses» sont sur le point d'être publiées.

VI.4 Division des Eaux d'Egout et Eaux industrielles résiduaires

Le Comité de cette Division s'est réuni deux fois durant la période couverte par ce rapport, lors du Congrès à Munich en septembre 1959 et à Londres en novembre 1960. Une autre réunion se tiendra probablement à Paris dans le courant de l'automne 1961.

Un symposium comprenant des communications sur les sujets ressortissant au champ d'activité de cette Division s'est tenu à Munich en 1959 à l'occasion de la Conférence de l'Union internationale de Chimie pure et appliquée. Les arrangements furent organisés par le pays invitant – l'Allemagne – en accord avec le Comité de la Division.

Au début de la période en question, quelques progrès ont été réalisés dans la préparation d'un rapport prévu pour publication et portant le titre «Réemploi de l'eau dans l'industrie – une contribution à la solution du problème des effluents». Il contiendra des communications sur le réemploi de l'eau dans les mines de charbon, l'industrie sidérurgique, l'usinage des métaux, la galvanoplastie, l'industrie chimique lourde et la fabrication du sucre de betterave. M. COLAS (France) a écrit une introduction générale et le Prof. KRUL (Hollande) l'avant-propos. L'éditeur général est M. COLAS. Rassembler ces nombreux rapports entraîna un travail considérable, mais le projet est maintenant en bonne voie. Cinq des chapitres sont déjà sous forme d'épreuves, et l'un d'eux a même été contrôlé et retourné à la maison d'édition BUTTERWORTHS. On espère que cette publication sera mise en vente dans le courant de 1961.

Le Comité s'est occupé de la possibilité de rédiger un second rapport à publier, traitant d'autres aspects des problèmes de la pollution. Néanmoins, rien de définitif n'a été décidé à ce sujet et aucune proposition concrète n'a pu être faite jusqu'à maintenant.

Il a été décidé de ne pas convoquer de réunion de cette Division à Montréal en 1961, mais d'organiser un symposium à Londres en 1963, à l'occasion de la prochaine Conférence. Dans ce cas, la Division examinerait la possibilité de convoquer une réunion mixte avec la Division de Fermentation.

VI.5 Division de Toxicologie et d'Hygiène industrielle

Depuis le dernier rapport, il n'y a pas eu de réunion de la Division. Le travail de cette Division a été poursuivi par correspondance, son souci essen-

tiel étant les préparatifs de sa réunion en 1961. Il est proposé de consacrer la plus grande partie de cette séance au dépistage des imprégnations provoquées par les substances toxiques utilisées dans l'industrie, grâce à des mesures analytiques sur les milieux biologiques, particulièrement l'urine et le sang. Les substances toxiques étudiées seront le mercure, le plomb, l'arsenic, l'oxyde de carbone, le benzène et le trichloréthylène. On procédera non seulement au choix des meilleures méthodes analytiques, mais aussi à la fixation des concentrations tolérables pour le travailleurs exposés et les limites de concentrations, s'il y en a, pour la population moins exposée.

Les méthodes d'analyse pour la détermination des 7 substances suivantes ont été soumises pour publication: hydrogène arsénié, benzidine dichloréthane, oxyde d'éthylène, 2-chloréthanol, β-naphtylamine et trinitrotuluène, ce qui portera à 28 le nombre total des méthodes publiées.

VI.6 Division des Pesticides

Des études sur les pesticides sont en cours dans un certain nombre d'organisations internationales, nationales et régionales. La Division a par conséquent pris soin qu'aucune autre étude ne soit entreprise qui pourrait faire double emploi avec les recherches déjà en cours. Dans ce but, le Président de la Division a recueilli les résultats des recherches effectuées par les organisations susmentionnées.

La Division estime qu'elle doit essentiellement remplir des fonctions de coordination; l'une de ses tâches est, par exemple, d'organiser des congrès sur les pesticides tous les deux ou trois ans.

La réunion à Munich a décidé d'examiner d'urgence la possibilité de tenir le 5e Congrès international sur la Protection des Récoltes en Rhodésie du Sud, ou, sinon en Suisse. Il était déjà clair à ce moment-là qu'il ne serait pas possible de trouver une organisation pouvant accorder son patronage à un tel congrès aux Etats-Unis.

Le Président et le Secrétaire de la Division des Pesticides ont essayé d'obtenir une décision au sujet de cette réunion. Malheureusement, il ne sera pas possible de tenir le prochain congrès en Rhodésie du Sud. Les contacts pris en Suisse n'ont pas encore abouti. Des diverses discussions avec des organisations pouvant patronner un tel congrès, il ressort clairement que le précédent congrès à Hambourg fut considéré comme couvrant un trop large domaine et comprenant trop de sujets. Le grand nombre de visiteurs rendit difficiles les réservations dans les hôtels. D'autre part, il ne fut pas aisé de trouver une organisation pouvant assumer les dépenses ou même supporter le risque que les taxes des participations ne couvrent pas les dépenses du congrès. Il fut également très difficile de recruter tout le personnel nécessaire pour la correspondance préparatoire et le travail administratif durant le congrès.

Jusqu'à fin 1961, la Division des Pesticides sera composée de 6 membres titulaires, y compris le Président et le Secrétaire. Le mandat de 3 membres expirera à fin 1961.

VI.7 Division des Plastiques et Produits de haute Polymérisation

Représentation nationale. A la suite d'une proposition faite lors de la réunion de Dusseldorf, une lettre fut envoyée en décembre 1959 à tous les organismes adhérents de l'IUPAC, les invitant à nommer des représentants nationaux afin de participer aux travaux de la Division. Résultat: 19 pays sont maintenant représentés: Allemagne, Australie, Autriche, Belgique, Brésil, Canada, Espagne, Etats-Unis, France, Hollande, Hongrie, Israël, Italie, Japon, Royaume-Uni, Suède, Suisse, Tchécoslovaquie et URSS. Trois pays

nous ont informés qu'ils ne désirent pas nommer de représentants en ce moment, soit: Afrique du Sud, Egypte et Inde.

Les *réunions suivantes* ont eu lieu depuis la 20e Conférence à Munich en 1959:

a) Une réunion de la Division, à laquelle participaient 16 membres, s'est tenue à Dusseldorf le 18 octobre 1959, et un symposium international sur le vieillissement des plastiques, tenu le jour suivant, a attiré 1900 participants en provenance de 24 pays. Les 7 communications présentées furent imprimées d'avance, en anglais, français et allemand, par CARL HANSER, Verlag, et publiées dans «Kunststoffe» *49*, No 11, 1959.

b) Le 16 juin 1960, 13 membres – qui assistaient au symposium organisé par la Commission des Macromolécules à Moscou – saisirent cette occasion pour convoquer une réunion extraordinaire à l'Hôtel Ukraïnia afin de discuter du programme et des activités de la Division.

c) Une réunion de la Division, comprenant 11 membres, s'est tenue à Turin le 27 septembre 1960. Le 28 septembre, un symposium d'un jour sur les résines renforcées du groupe des polyesters fut organisé conjointement par la Division et le 22e Congrès international des Plastiques, au cours duquel 6 conférences furent présentées par des personnalités de 5 pays différents. Les comptes rendus complets du Congrès seront publiés par la maison d'édition ETAS, Milan (Italie). Les communications paraîtront également dans un numéro spécial de «Poliplasti e Plastici Rinforzati», également publié par la maison d'édition ETAS. Environ 300 participants assistèrent à ce Congrès.

d) A part les réunions de la Division lors de la 21e Conférence à Montréal, une session de deux jours se tiendra – faisant partie du Congrès – sur les relations entre les structures chimiques des polymères et leurs propriétés physiques, mécaniques, électriques et rhéologiques.

e) Des démarches sont en cours afin de co-patronner un symposium à Paris avec le Groupe des Plastiques de la Société de Chimie industrielle, du 21 au 26 mai 1962, en parallèle avec l'Exposition europlastique qui aura lieu du 19 au 30 mai 1962.

Programme de travail. Les sujets suivants ont été proposés à Dusseldorf comme pouvant être très utiles en tant qu'activités de la Division à l'échelon international:

1o Recueil de données sur les propriétés des plastiques
2o Guide à l'usage des fabricants, leur fournissant des données sur les nouvelles matières
3o Etude de la législation sur l'alimentation et les produits pharmaceutiques concernant l'emploi des hauts polymères
4o Revue des problèmes de toxicité
5o Préparation des définitions concernant les matières plastiques et les procédés y relatifs
6o Investigations des procédés analytiques de base
7o Compilation des données statiques de base, nécessaires à l'industrie de la construction (torsion, dilatation, rupture)
8o Compilation des données climatiques nécessaires, par exemple dans les industries de construction et d'électricité
9o Normalisation des abréviations pour les plastiques
10o Tests d'identification
11o Classifications des plastiques du point de vue des fabricants et des utilisateurs
12o Problèmes de corrosion, y compris attaque et protection
13o Histoire des plastiques
14o Méthodes de détermination et d'expression des poids moléculaires pour les plastiques commerciaux

15° Recommandations sur la compilation des statistiques de production pour les matières plastiques
16° Revue des classifications douanières pour les plastiques, y compris contrôles et spécifications
17° Couleurs-étalons pour les matières plastiques
18° Relations entre les caractéristiques de performance des paramètres de base des polymères et les procédés de fabrication définis très exactement, particulièrement en ce qui concerne *a)* les contrôles de performance, *b)* les procédés définissant les différents stades de la fabrication et *c)* les paramètres de base normalisés, y compris les constantes physiques, la structure moléculaire et les caractéristiques morphologiques.

Afin de décider de l'urgence de ces travaux, un questionnaire fut distribué en février 1960, et l'on s'occupe déjà des points 3, 7, 8, 9, 11 et 16. Le point 18 est extrêmement important et l'on examine très sérieusement la possibilité d'une étude dans ce domaine.

En ce qui concerne le point 11, plus de 1100 exemplaires du rapport intitulé «Classifications des hauts polymères: revue critique» ont été distribués par la maison d'édition BUTTERWORTHS. Un groupe de travail a été formé afin de rédiger un supplément à cette revue, tenant compte des propositions faites depuis la préparation du premier rapport. Le Président s'efforcera également de préparer une nouvelle proposition résumant les questions ayant réuni l'assentiment lors de discussions antérieures.

Au sujet du point 9, la proposition de normaliser les abréviations est en cours de revision, sur la base des commentaires reçus de puis la réunion de Dusseldorf, pour une nouvelle soumission aux membres de la Division. Ils seront également envoyés au groupe de travail 1 («Nomenclature et Définition») de l'ISO/TC61.

Quelques documents devront être distribués au sujet du point 12, et pour les points 3, 15 et 16, une lettre a été préparée, soulignant les renseignements désirés; un membre de chaque nation sera prié de recueillir les informations nécessaires dans son pays et de participer à un groupe de travail.

Une *liaison* a été maintenue avec la Commission des Macromolécules et avec le Comité international de Normalisation des Plastiques (ISO/TC61). Il leur fut soumis un rapport sur le travail de la Division, et eux-mêmes ont envoyé à la Division un rapport sur leurs propres travaux.

A la suite d'un memorandum soumis au Bureau de l'IUPAC par le Comité exécutif, au sujet de changements éventuels dans l'organisation de la Section de Chimie appliquée, une résolution fut adoptée à l'unanimité à Turin stipulant que, vu les points: 1° importance de l'industrie des plastiques et le champ très vaste de ses activités industrielles, 2° le domaine également très étendu et les programmes de recherches scientifiques représentés par la science des polymères et 3° la collaboration et la coordination existantes entre les activités internationales de la Commission des Macromolécules dans le champ de la science pure et celles de la Division des Plastiques et Produits de haute Polymérisation dans le domaine de la chimie appliquée, la fusion de ces deux groupes est indésirable et impossible.

VI.8 Division des Revêtements de Surface

La réunion intermédiaire de la Division en 1960 s'est tenue en septembre à Londres, lors de l'ouverture des laboratoires Jordan de la Station de Recherche pour la Peinture. Deux demi-journées des réunions furent consacrées aux sessions du Sous-Comité des Méthodes analytiques, et quatre demi-journées aux séances du Sous-Comité des Procédés de Contrôle.

Sous-Comité des Méthodes analytiques: Une communication sur les méthodes micro-chimiques d'analyse, préparée par M. C. WHALLEY, et un rapport sur l'«Analyse des résines alcoylées» par le Dr J. PETIT, ainsi qu'une communication complémentaire sur l'«Analyse infrarouge des résines alcoylées» de M. H. K. RAASCHOU NIELSEN feront l'objet de discussions lors de la réunion de 1961.

Il est proposé d'appliquer les méthodes d'analyse des huiles siccatives, telles qu'elles ont été publiées par la Division des Matières grasses, aux besoins de l'industrie des peintures et vernis, et – de plus – de développer les méthodes de détermination des substances suivantes: indice de polybromation, indice d'hydroxyle (spécialement pour les résines alcoylées), taux d'huiles oxydées, d'acides monomères, dimères et trimères et de résine.

Sous-Comité des Procédés de Contrôle: L'étude principale actuelle de ce Sous-Comité est la préparation d'une revue critique de la littérature sur les contrôles de dureté des pellicules des peintures et vernis. Lors de la réunion de Londres, M. P. FINK-JENSEN s'est occupé de l'*introduction théorique*, alors que le Dr D. WAPLER a présenté une courte communication additionnelle sur les *méthodes technologiques*, et le Dr OESTERLE faisait une communication générale sur le contrôle de la dureté, dans laquelle il a souligné l'importance du contrôle de la dureté à l'échelle infinitésimale. Le Dr J. A. W. VAN LAAR a parlé alors de la corrélation entre les très nombreux contrôles en laboratoire et les propriétés fondamentales des pellicules.

A la suite des discussions des contributions individuelles de la réunion de Londres, les auteurs ont revisé leurs communications. Après un entretien final, lors de la réunion de 1961, le Sous-Comité espère préparer une étude critique de la littérature, pour publication aussitôt que possible.

Sous-Comité de la Terminologie: Bien qu'il n'y ait pas eu de réunion ordinaire du Sous-Comité de la Terminologie lors de la rencontre de Londres, le problème de la traduction des questions concernant l'industrie des revêtements de surface fut discuté en rapport avec un memorandum sur ce sujet, préparé par le Dr L. A. JORDAN. L'opinion unanime des membres fut que le manuel envisagé comblerait une lacune ressentie depuis longtemps; le Dr L. A. JORDAN fut en conséquence prié de poursuivre la rédaction de cet ouvrage en langue anglaise.

Composition de la Division: Il fut décidé d'inviter le Directeur de l'Institut belge de recherche pour les peintures et vernis, M. A. CAILLIEZ, à devenir membre titulaire de la Division, et le Directeur de l'Institut suédois de recherche pour les peintures et vernis, le Dr M. I. HUSS, à devenir membre délégué de la Division.

Prochaine réunion: La plupart des travaux de la Division des Revêtements de Surface sont accomplis par les Sous-Comités, dont tous les membres résident en Europe; c'est pourquoi il a été admis que la Division ne se réunirait pas à Montréal durant la Conférence de l'IUPAC en 1961. Etant donné que la Division n'a jamais tenu de réunion en Scandinavie, il fut décidé que la session de 1961 aurait lieu à Copenhague au début de l'été. Les dates exactes ont, depuis, été fixées du 26 au 28 juin.

VI.9 Division de la Pâte, du Papier et du Carton

Le Comité de la Division ne s'est pas réuni depuis le Congrès de Munich en 1959, mais les membres ont poursuivi leurs travaux par correspondance.

Le travail scientifique a progressé régulièrement par l'intermédiaire de la Commission nommée «Comité international pour les Analyses de la Cellulose». Les méthodes ont été systématiquement évaluées dans divers laboratoires et adoptées lorsqu'une recherche approfondie a rencontré un accord unanime quant à leur validité.

De grands efforts ont été accomplis pour organiser un symposium sur la Chimie du Bois, qui se tiendra en parallèle avec la Conférence de 1961 à Montréal. Des contributions seront apportées, sur invitation seulement. Un programme remarquable a été prévu afin d'attirer l'attention mondiale, qui contribuera d'une manière significative à notre connaissance de la chimie du bois et permettra un échange d'idées dans ce domaine entre de nombreuses personnalités faisant autorité dans différents pays du monde.

La contribution générale essentielle qui peut être apportée par cette Division réside dans le domaine d'un échange des connaissances à une échelle internationale la plus vaste possible. A cet égard, nous soulignons à nouveau (ainsi que nous l'avons fait auparavant) que cette Division est sérieusement handicapée par la limitation du nombre de ses membres titulaires à huit. Les recherches entreprises maintenant en URSS et en Tchécoslovaquie, par exemple, sont d'une telle envergure qu'elles rendent la Division incomplète s'il ne figure pas de représentants de ces pays dans son Comité. La nécessité d'une augmentation du nombre des membres titulaires de 8 à 10 est à nouveau soulignée ici.

D'autres démarches ont été entreprises concernant la normalisation de la politique des publications dans les journaux intéressant particulièrement le domaine de la pâte, du papier et du carton.

Une étude préliminaire, portant sur l'opportunité d'établir un répertoire des projets courants de recherche dans les instituts de recherche et d'enseignement à travers le monde, a montré que les frais entraînés seraient élevés, et le projet a été ajourné pour le moment. Nous estimons toutefois que cette idée a une grande valeur et ne devrait pas être abandonnée complètement.

REPORT OF THE COMMISSION ON ATOMIC WEIGHTS

(1961)

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SUMMARY MINUTES OF THE COMMISSION ON ATOMIC WEIGHTS (1961)

(1) The Commission met in Montreal on 2, 3 and 4 August, 1961, as follows:

Present:

Members: Prof. T. Batuecas (President), Prof. A. Ölander (Vice-President), Dr. A.E. Cameron, Prof. J. Guéron (Secretary), Prof. H. Remy.

Associate Member: Dr. E. Wichers.

Excused:

Members: Prof. H.V. Briscoe, Prof. V. Caglioti, Prof. J. Mattauch.

Associate Members: Prof. J. Krepelka, Prof. A.O. Nier, Prof. M. Perey.

Prof. V.B. Erofeev attended the meetings of 3 and 4 August as an observer, at the request of the Chairman of the USSR Delegation.

(2) The Commission agreed to recommend that the new scale of relative atomic weights, based on the exact number 12 for $^{12}_{6}C$, be adopted.

This was agreed by all members present. Those excused had agreed in letters exchanged with the President, except for one who had not expressed any opinion.

(3) Following a suggestion from its President, the Commission agreed by unanimous opinion of the members present at Montreal to propose that its name be changed to "Commission on Atomic Masses" and that the Tables to be issued in future be entitled "Tables of Relative Atomic Masses". The matter, submitted to the IUPAC bureau, is still pending.

(4) The Commission discussed extensively the preparation of the new revised Table. It felt that the change of scale gave an opportunity for complete reconsideration of the Table. This work had been prepared by extensive reports by Dr. A.E. Cameron (for evidence from mass spectrometric measurements) and by Dr. E. Wichers for the data derived from chemical determinations. These combined reports, in their final form, have been submitted to all members and are printed hereafter.

T. Batuecas, President
J. Guéron, Secretary

TABLE OF RELATIVE ATOMIC WEIGHTS 1961

BASED ON THE ATOMIC MASS OF $^{12}C = 12$

The values for atomic weights given in the Table apply to elements as they exist in nature, without artificial alteration of their isotopic composition, and, further, to natural mixtures that do not include isotopes of radiogenic origin.

Order of Atomic Number

Atomic Number	Name	Symbol	Atomic Weight
1	Hydrogen	H	1.00797[a]
2	Helium	He	4.0026
3	Lithium	Li	6.939
4	Beryllium	Be	9.0122
5	Boron	B	10.811[a]
6	Carbon	C	12.01115[a]
7	Nitrogen	N	14.0067
8	Oxygen	O	15.9994[a]
9	Fluorine	F	18.9984
10	Neon	Ne	20.183
11	Sodium	Na	22.9898
12	Magnesium	Mg	24.312
13	Aluminium	Al	26.9815
14	Silicon	Si	28.086[a]
15	Phosphorus	P	30.9738
16	Sulfur	S	32.064[a]
17	Chlorine	Cl	35.453[b]
18	Argon	Ar	39.948
19	Potassium	K	39.102
20	Calcium	Ca	40.08
21	Scandium	Sc	44.956
22	Titanium	Ti	47.90
23	Vanadium	V	50.942
24	Chromium	Cr	51.996[b]
25	Manganese	Mn	54.9380
26	Iron	Fe	55.847[b]
27	Cobalt	Co	58.9332
28	Nickel	Ni	58.71
29	Copper	Cu	63.54
30	Zinc	Zn	65.37
31	Gallium	Ga	69.72
32	Germanium	Ge	72.59
33	Arsenic	As	74.9216
34	Selenium	Se	78.96
35	Bromine	Br	79.909[b]
36	Krypton	Kr	83.80
37	Rubidium	Rb	85.47
38	Strontium	Sr	87.62
39	Yttrium	Y	88.905
40	Zirconium	Zr	91.22
41	Niobium	Nb	92.906
42	Molybdenum	Mo	95.94
43	Technetium	Tc	.....
44	Ruthenium	Ru	101.07
45	Rhodium	Rh	102.905
46	Palladium	Pd	106.4
47	Silver	Ag	107.870[b]
48	Cadmium	Cd	112.40
49	Indium	In	114.82
50	Tin	Sn	118.69
51	Antimony	Sb	121.75
52	Tellurium	Te	127.60
53	Iodine	I	126.9044
54	Xenon	Xe	131.30
55	Caesium	Cs	132.905
56	Barium	Ba	137.34
57	Lanthanum	La	138.91
58	Cerium	Ce	140.12
59	Praseodymium	Pr	140.907
60	Neodymium	Nd	144.24
61	Promethium	Pm	......
62	Samarium	Sm	150.35
63	Europium	Eu	151.96
64	Gadolinium	Gd	157.25
65	Terbium	Tb	158.924
66	Dysprosium	Dy	162.50
67	Holmium	Ho	164.930
68	Erbium	Er	167.26
69	Thulium	Tm	168.934
70	Ytterbium	Yb	173.04
71	Lutetium	Lu	174.97
72	Hafnium	Hf	178.49
73	Tantalum	Ta	180.948
74	Tungsten	W	183.85
75	Rhenium	Re	186.2
76	Osmium	Os	190.2
77	Iridium	Ir	192.2
78	Platinum	Pt	195.09
79	Gold	Au	196.967
80	Mercury	Hg	200.59
81	Thallium	Tl	204.37
82	Lead	Pb	207.19
83	Bismuth	Bi	208.980
84	Polonium	Po	......
85	Astatine	At	......
86	Radon	Rn	......

Atomic Number	Name	Symbol	Atomic Weight	Atomic Number	Name	Symbol	Atomic Weight
87	Francium	Fr	......	95	Americium	Am	......
88	Radium	Ra	......	96	Curium	Cm	......
89	Actinium	Ac	......	97	Berkelium	Bk	......
90	Thorium	Th	232.038	98	Californium	Cf	......
91	Protactinium	Pa	......	99	Einsteinium	Es	......
92	Uranium	U	238.03	100	Fermium	Fm	......
93	Neptunium	Np	......	101	Mendelevium	Md	......
94	Plutonium	Pu	......	102	Nobelium	No	......

[a] Atomic weights so designated are known to be variable because of natural variations in isotopic composition. The observed ranges are:

Hydrogen	±0.00001	Oxygen	±0.0001
Boron	±0.003	Silicon	±0.001
Carbon	±0.00005	Sulfur	±0.003

[b] Atomic weights so designated are believed to have the following experimental uncertainties:

Chlorine	±0.001	Bromine	±0.002
Chromium	±0.001	Silver	±0.003
Iron	±0.003		

Table of Relative Atomic Weights 1961

Based on the Atomic Mass of $^{12}C = 12$

The values for atomic weights given in the Table apply to elements as they exist in nature, without artificial alteration of their isotopic composition, and, further, to natural mixtures that do not include isotopes of radiogenic origin.

Alphabetical Order in English

Name	Symbol	Atomic Number	Atomic Weight
Actinium	Ac	89	......
Aluminium	Al	13	26.9815
Americium	Am	95	......
Antimony	Sb	51	121.75
Argon	Ar	18	39.948
Arsenic	As	33	74.9216
Astatine	At	85	......
Barium	Ba	56	137.34
Berkelium	Bk	97	......
Beryllium	Be	4	9.0122
Bismuth	Bi	83	208.980
Boron	B	5	10.811[a]
Bromine	Br	35	79.909[b]
Cadmium	Cd	48	112.40
Caesium	Cs	55	132.905
Calcium	Ca	20	40.08
Californium	Cf	98	......
Carbon	C	6	12.01115[a]
Cerium	Ce	58	140.12
Chlorine	Cl	17	35.453[b]
Chromium	Cr	24	51.996[b]
Cobalt	Co	27	58.9332
Copper	Cu	29	63.54
Curium	Cm	96	......
Dysprosium	Dy	66	162.50
Einsteinium	Es	99	......
Erbium	Er	68	167.26
Europium	Eu	63	151.96
Fermium	Fm	100	......
Fluorine	F	9	18.9984
Francium	Fr	87	......
Gadolinium	Gd	64	157.25
Gallium	Ga	31	69.72
Germanium	Ge	32	72.59
Gold	Au	79	196.967
Hafnium	Hf	72	178.49
Helium	He	2	4.0026
Holmium	Ho	67	164.930
Hydrogen	H	1	1.00797[a]
Indium	In	49	114.82
Iodine	I	53	126.9044
Iridium	Ir	77	192.2
Iron	Fe	26	55.847[b]
Krypton	Kr	36	83.80
Lanthanum	La	57	138.91
Lead	Pb	82	207.19
Lithium	Li	3	6.939
Lutetium	Lu	71	174.97
Magnesium	Mg	12	24.312
Manganese	Mn	25	54.9380
Mendelevium	Md	101	......
Mercury	Hg	80	200.59
Molybdenum	Mo	42	95.94
Neodymium	Nd	60	144.24
Neon	Ne	10	20.183
Neptunium	Np	93	......
Nickel	Ni	28	58.71
Niobium	Nb	41	92.906
Nitrogen	N	7	14.0067
Nobelium	No	102	......
Osmium	Os	76	190.2
Oxygen	O	8	15.9994[a]
Palladium	Pd	46	106.4
Phosphorus	P	15	30.9738
Platinum	Pt	78	195.09
Plutonium	Pu	94	......
Polonium	Po	84	......
Potassium	K	19	39.102
Praseodymium	Pr	59	140.907
Promethium	Pm	61	......
Protactinium	Pa	91	......
Radium	Ra	88	......
Radon	Rn	86	......
Rhenium	Re	75	186.2
Rhodium	Rh	45	102.905
Rubidium	Rb	37	85.47
Ruthenium	Ru	44	101.07
Samarium	Sm	62	150.35
Scandium	Sc	21	44.956
Selenium	Se	34	78.96
Silicon	Si	14	28.086[a]
Silver	Ag	47	107.870[b]
Sodium	Na	11	22.9898
Strontium	Sr	38	87.62
Sulfur	S	16	32.064[a]
Tantalum	Ta	73	180.948

Name	Symbol	Atomic Number	Atomic Weight	Name	Symbol	Atomic Number	Atomic Weight
Technetium	Tc	43	......	Tungsten	W	74	183.85
Tellurium	Te	52	127.60	Uranium	U	92	238.03
Terbium	Tb	65	158.924	Vanadium	V	23	50.942
Thallium	Tl	81	204.37	Xenon	Xe	54	131.30
Thorium	Th	90	232.038	Ytterbium	Yb	70	173.04
Thulium	Tm	69	168.934	Yttrium	Y	39	88.905
Tin	Sn	50	118.69	Zinc	Zn	30	65.37
Titanium	Ti	22	47.90	Zirconium	Zr	40	91.22

[a] Atomic weights so designated are known to be variable because of natural variations in isotopic composition. The observed ranges are:

Hydrogen	±0.00001	Oxygen	±0.0001
Boron	±0.003	Silicon	±0.001
Carbon	±0.00005	Sulfur	±0.003

[b] Atomic weights so designated are believed to have the following experimental uncertainties:

Chlorine	±0.001	Bromine	±0.002
Chromium	±0.001	Silver	±0.003
Iron	±0.003		

The Radioactive Elements 1961

Order of Atomic Number

Atomic Number	Name	Symbol	Isotope	Half-life		Mode of Disintegration
43	Technetium	Tc	99*	2.1×10^5	years	β-
61	Promethium	Pm	147*	2.6	years	β-
84	Polonium	Po	210*	138	days	α
85	Astatine	At	210	8.3	hours	α
86	Radon	Rn	222	3.8	days	α
87	Francium	Fr	223	22	minutes	β-
88	Radium	Ra	226	1622	years	α
89	Actinium	Ac	227	21	years	β-, α
90	Thorium	Th	232	1.4×10^{10}	years	α
91	Protactinium	Pa	231	3.4×10^4	years	α
92	Uranium	U	238	4.5×10^9	years	α
93	Neptunium	Np	237	2.1×10^6	years	α
94	Plutonium	Pu	242	3.8×10^5	years	α
95	Americium	Am	243	7.8×10^3	years	α
96	Curium	Cm	247	$>4 \times 10^7$	years	α
97	Berkelium	Bk	247	ca. 10^4	years	α
98	Californium	Cf	249	360	years	α
99	Einsteinium	Es	254	ca. 320	days	α
100	Fermium	Fm	253	3	days	α
101	Mendelevium	Md	256	ca. 1.5	hours	electron capture
102	Nobelium	No		ca. 10	minutes	α

This table lists selected isotopes of the chemical elements, whether occurring in nature or known only through synthesis, that are commonly classed as radioactive. The listed isotope may be either the one of longest known half-life or, for those marked with an asterisk, a better known one.

The Radioactive Elements 1961

Alphabetical Order

Name	Symbol	Atomic Number	Isotope	Half-life		Mode of Disintegration
Actinium	Ac	89	227	21	years	β-, α
Americium	Am	95	243	7.8×10^3	years	α
Astatine	At	85	210	8.3	hours	α
Berkelium	Bk	97	247	ca. 10^4	years	α
Californium	Cf	98	249	360	years	α
Curium	Cm	96	247	$>4 \times 10^7$	years	α
Einsteinium	Es	99	254	ca. 320	days	α
Fermium	Fm	100	253	3	days	α
Francium	Fr	87	223	22	minutes	β-
Mendelevium	Md	101	256	ca. 1.5	hours	electron capture
Neptunium	Np	93	237	2.1×10^6	years	α
Nobelium	No	102		ca. 10	minutes	α
Plutonium	Pu	94	242	3.8×10^5	years	α
Polonium	Po	84	210*	138	days	α
Promethium	Pm	61	147*	2.6	years	β-
Protactinium	Pa	91	231	3.4×10^4	years	α
Radium	Ra	88	226	1622	years	α
Radon	Rn	86	222	3.8	days	α
Technetium	Tc	43	99*	2.1×10^5	years	β-
Thorium	Th	90	232	1.4×10^{10}	years	α
Uranium	U	92	238	4.5×10^9	years	α

This table lists selected isotopes of the chemical elements, whether occurring in nature or known only through synthesis, that are commonly classes as radioactive. The listed isotope may be either the one of longest known half-life, or, for those marked with an asterisk, a better known one.

COMPREHENSIVE REVIEW

A. E. CAMERON and E. WICHERS

INTRODUCTION

Since early in this century the atomic weights of chemical elements have been referred to oxygen, with assigned integral atomic weight of 16. The discovery by GIAUQUE and JOHNSTON [G2], in 1929, that oxygen contains small amounts of isotopes of mass numbers 17 and 18, and later observations that the proportions of these isotopes are slightly variable, made the element oxygen somewhat unsatisfactory as a reference species for chemical determinations of atomic weights and unacceptable for a scale of nuclidic masses. For the latter purpose, a new scale, based on 16 as the nuclidic mass of oxygen 16, became firmly established as the one to which physical measurements of nuclidic masses were referred.

By 1940 the proportions of ^{17}O and ^{18}O in oxygen had been so well established that from that year forward the International Commission used the divisor 1.000275 to convert values based on the physical scale to values used in the International Table of Atomic Weights. Thus, in actual practice, if not by formal definition, there has been, since 1940, an exact relationship between the two scales. Uncertainties in atomic weights arising from variability in the composition of oxygen were relatively unimportant until the increasing accuracy of physical measurements made it possible to improve the exactness with which the atomic weights of the simple, or mononuclidic, elements could be stated.

The problems created by having two scales so nearly alike have led to discussions [W6, B4] over a period of years about the possibility of adopting a unified scale. To do this would require abandoning one of the existing scales in favor of the other or abandoning both for a new scale. It was clear that abandoning the physical scale in favor of the chemical scale would be unacceptable for various reasons to those who used it—in particular, because on the chemical scale no single nuclide would have an integral mass and the useful device of the absolute mass unit as 1/16 of the atomic mass of ^{16}O would be sacrificed. The other alternative, of adopting the physical scale exclusively, was known to be unacceptable to many chemists because this change would introduce a systematic error of nearly 3 parts in 10000 into all data recorded on a gram-equivalent or molar basis.

At the conclusion of the Commission's meeting in Paris in 1957 no satisfactory solution had been found, and a decision was deferred. However, soon after the Paris meeting two members of the Commission, in correspondence with E. WICHERS, then its President, independently suggested consideration of a nuclide, other than ^{16}O, as a reference species for a new, unified scale. J. MATTAUCH, on the basis of an earlier discussion with A. O. C. NIER, pointed out that ^{12}C, with assigned mass 12, might be as acceptable a reference species for physicists as ^{16}O, especially since it was already the commonly used operational standard for mass spectroscopy. Its adoption would require no greater systematic changes in the table of atomic weights than would an earlier proposal to adopt the element fluorine, with assigned atomic weight 19, a proposal which was unacceptable to physicists. A scale based on $^{19}F = 19$ would have made atomic weights larger by about 4 parts in 100000. The ^{12}C scale results in a change of the same magnitude but in the opposite direction. A. ÖLANDER pointed out that an isotopic species, such as ^{12}C, should be just as acceptable to chemists as the element fluorine but that ^{18}O, with assigned mass of 18, might be

preferable because it would involve an even smaller systematic change in the table of atomic weights. These suggestions were recorded in an addendum to the Commission's report for 1957 and furnished the basis for further exploration of the possibility of adopting a unified scale.

At the 1959 meeting of the Commission, during the 20th Conference of IUPAC at Munich, the Commission recommended the adoption of ^{12}C, with assigned integral mass of 12, as the reference species for a new scale, provided the International Union of Pure and Applied Physics acted similarly to adopt the ^{12}C scale in the place of the ^{16}O scale. This action was taken by IUPAP at its General Assembly in Ottawa in 1960.

In anticipation of the final adoption of the new scale, the Commission in 1959 assigned to A.E. CAMERON and E. WICHERS the task of preparing a revised table of atomic weights for consideration by the Commission in 1961. Dr. CAMERON was elected a member in 1959 to succeed Prof. A.O.C. NIER. Dr. WICHERS, who was succeeded as President by Prof. T. BATUECAS, continued as an associate member of the Commission. Drs. CAMERON and WICHERS divided between them the task of an element-by-element review in accordance with their respective specialized interests in the physical and chemical work from which atomic weights are derived, and collaborated in preparing the portion of this report that contains the material on which the Commission based its recommendations. Prof. BATUECAS reviewed the experimental work on the density of neon and recalculated the atomic weight of this element.

Dr. CAMERON was assisted in his work by Prof. A.O.C. NIER, who also continued as an associate member of the Commission, and by Mr. E.J. SPITZER of the Oak Ridge National Laboratory. Dr. WICHERS received extensive assistance in his part of the work from Dr. D. NORMAN CRAIG and was aided also by Dr. DANIEL LEUSSING, both members of the staff of the National Bureau of Standards.

Prior to the Montreal meeting of the Commission, Drs. CAMERON and WICHERS met to discuss the results of their individual reviews of experimental evidence and prepared a table of recommended values which was transmitted to the President of the Commission for distribution among the members. When the Commission convened at Montreal the recommendations were examined in detail and, with some modifications, incorporated in the proposed 1961 Table of Atomic Weights, based on 12 as the assigned nuclidic mass of ^{12}C. This table was submitted to the Committee of the Inorganic Section and, on recommendation of that Committee, was approved by the Council of the Union.

In submitting its report the Commission also recommended that its name be changed to the Commission on Atomic Masses, and that the table be known as the Table of Relative Atomic Masses rather than the Table of Atomic Weights. The Committee of the Inorganic Section withheld endorsement of these recommendations pending their referral to the Commission on Inorganic Nomenclature. After consideration of this question by correspondence, the Commission on Nomenclature recommended retaining the name "Commission on Atomic Weights" and changing the title "Table of Atomic Weights" to "Table of Relative Atomic Weights". These terms are, therefore, used in this report.

REVIEW OF NUCLIDIC MASSES AND ISOTOPIC ABUNDANCES

When the General Assembly of IUPAP adopted the mass scale based on $^{12}C = 12$, on 8 September, 1960, the newly formed "Commission on Nuclidic Masses" was instructed to arrange for the wide and rapid distribution of the Mass Table based upon this reference nuclide. The table is a complete and consistent list of nuclidic masses computed with least squares methods from all the significant experimental data available from doublet measurements and from Q-values. This extensive compilation made by EVERLING, KÖNIG, MATTAUCH and WAPSTRA [E2] (1960) has been the principal source of values for the recalculation of atomic weights, based upon physical measurements. In the region from samarium through thallium, masses from the recent determinations by BHANOT, JOHNSON and NIER [B41] (1960) have been used. These data were not available to EVERLING, KÖNIG, MATTAUCH and WAPSTRA for inclusion in their 1960 compilation. (A revision of the Table of Relative Nuclidic Masses by the same authors has appeared in 1962 and includes these data.) These two sources of nuclidic masses will be referred to repeatedly in this report and will be designated EKMW (1960) and BJN (1960).

The scale conversion factor between the ^{16}O and ^{12}C scales of nuclidic masses from the adjustment made by EKMW [E3] (1961) is

$$1 \text{ u} = (1.000317917 \pm 0.000000017) \text{ MU } (^{16}O = 16)$$

and the reciprocal of this is 0.999682184 ± 17. This factor has been used to convert the masses of BJN (1960), which were given by them on the ^{16}O scale, to the ^{12}C scale.

In the case of the simple or "mononuclidic" elements the mass values and the values of the relative atomic weights are identical, and the latter are given in this report to a minimum of five digits. In no case is the last digit uncertain if the element is truly mononuclidic. For many of these elements careful mass spectrometric observations have been made and very low limits of abundances have been established for the existence of other stable nuclides of the elements. In all cases radioactive nuclides are known to exist in adjacent mass positions, and the existence of undiscovered stable isotopes is considered very unlikely.

In the case of the polynuclidic elements the uncertainty in the values of the relative atomic weights arises entirely from limitations in the accuracy of the isotopic abundance measurements. These have been tabulated to December 1958 in Nuclear Data Tables [N9] (1959). These tables are referred to in the text as NDT (1959). Isotopic abundances are stated in atom percent. References to the original literature are cited except where the original literature is not readily accessible, or where a number of isotopic determinations have been averaged to give the abundances used in the atomic weight calculation. In these cases the reference is to NDT (1959).

In only a limited number of cases have "absolute" mass spectrometric abundance measurements been made by standardizing the mass spectrometer with calibration mixtures prepared from separated isotopes of high chemical and isotopic purity. The elements for which this has been done are notably boron, nitrogen, chlorine, argon, chromium, silver and uranium. Determinations of this kind are urgently needed for many other elements for which atomic weights cannot be stated presently with the desired accuracy. Work of this kind is hardly less exacting than were the classical determinations of atomic weights by chemical measurements.

In the selection of abundance measurements upon which to base the calculated atomic weights, it has been necessary to exercise some judgment. Preference has been given, in general, to measurements made specifically for the determination of natural abundances rather than to those made incidentally to other studies. Observations in which an attempt was made to estimate systematic errors by measurement of another element in the same mass region for which the abundances are well established, while not absolute, are nevertheless to be preferred. Where no judgment was made between published measurements, the unweighted average of the results was used. In many cases it was observed that the published abundances did not add to exactly 100%. If the original ratios were available the abundances were recalculated. If these ratios could not be found, the practice was to prorate the discrepancy over all of the masses. The last small discrepancy was added to or subtracted from the mass or masses nearest the center of mass of the system.

REVIEW OF CHEMICAL DETERMINATIONS

During the past 25 years the determination of atomic weights by mass spectrometric measurements and by the calculation of mass changes involved in nuclear reactions has assumed constantly increasing importance. Today such measurements supply virtually the only new evidence bearing on the selection of values for the International Table of Relative Atomic Weights. Prior to the current revision, evidence derived from physical measurements provided the primary or exclusive basis for revisions of the atomic weights of 32 elements. In the 1961 table, this number is considerably larger and includes all of the elements regarded as mononuclidic. For some of the remaining elements listed in the table, values derived from physical measurements agree within their estimated limits of accuracy with those based on recalculated chemical determinations. There remain a small number of elements for which the values derived from physical measurements differ significantly from those derived from chemical measurements. These physically derived values were not regarded as sufficiently reliable to displace the recalculated chemical values.

Because silver, chlorine, and bromine have been so extensively involved in the chemical determination of atomic weights, a thorough reappraisal of these key elements was essential for the preparation of this report. The discussion of this critical review follows.

Ratios of Silver to Chlorine and Silver to Bromine

The combining weights of silver with chlorine and of silver with bromine were determined with high precision both by Richards and Baxter and their associates at Harvard, and by Hönigschmid and his associates at Munich. Richards and Wells [R6] (1905) dissolved weighed amounts of silver, precipitated silver chloride with hydrochloric acid, and collected, fused, and weighed the chloride. In seven of ten determinations the silver chloride was transferred twice in the course of the operation. The ratio AgCl/Ag was 1.328667, with a standard deviation of the mean of 0.000010. Three of the determinations were made without transfer of the silver chloride from the vessel in which it was formed. For these three the observed ratio was 1.328673, with a standard deviation of 0.000014.

In nine experiments HÖNIGSCHMID and CHAN [H23] (1927) reduced weighed amounts of chlorine with arsenite and titrated the chloride nephelometrically with silver nitrate prepared from weighed amounts of silver. They obtained, thereby, 1.328668 for the ratio of $\frac{Ag + Cl}{Ag}$ with a standard deviation of 0.000002 for the mean. In addition they collected and weighed the silver chloride in eight of the experiments. The results of these experiments, subsequently corrected by HÖNIGSCHMID [H28] (1931) for errors arising from the solubility of silver chloride, yielded a slightly different value, 1.328682, with a standard deviation of 0.000002. Because questions can be raised about the validity of their calculated corrections this result deserves less consideration than the other, which involved no corrections.

A third ratio for AgCl/Ag can be computed as the quotient of the ratios $AgNO_3$/Ag and $AgNO_3$/AgCl. The ratio $AgNO_3$/Ag as determined by HÖNIGSCHMID, ZINTL and THILO [H24] (1927) was 1.5747906, with 0.0000022 as the standard deviation of the mean of 14 determinations. HÖNIGSCHMID and SCHLEE [H40] (1936) measured the ratio $AgNO_3$/AgCl by converting the nitrate to chloride without transfer. The observed value was 1.1852410, with a standard deviation of the mean of eight measurements of 0.0000008. The ratio AgCl/Ag obtained as the quotient of the two ratios given above is 1.328667, with a standard deviation of 0.000002. Since the two ratios involving $AgNO_3$ were measured in the same laboratory, it is reasonable to assume that the nitrate was prepared in the same way and thus that uncertainties about its exact composition are minimized. It may be noted that this calculated ratio agrees exactly with that obtained from the first seven determinations of RICHARDS and WELLS and almost exactly with the first of the two ratios derived from the results of HÖNIGSCHMID and CHAN.

The combining weight of silver with bromine was also determined in both the Harvard and Munich laboratories. BAXTER [B5] (1906), after converting weighed amounts of silver to silver nitrate, precipitated the silver with hydrobromic acid, and collected and weighed the silver bromide. The observed ratio AgBr/Ag was 1.740788, with a standard deviation of 0.000007 for the mean of 18 determinations. Another value for this ratio can be calculated from the results, given in the same publication, of 13 experiments in which silver bromide was converted to silver chloride. If the ratio for AgBr/AgCl so obtained (1.310170) is multiplied by the previously mentioned ratio for AgCl/Ag (1.328667), the ratio for AgBr/Ag is 1.740780. This ratio differs by only 5 parts in one million from the one obtained by the synthesis of silver bromide.

HÖNIGSCHMID and ZINTL [H18] (1923) reduced weighed amounts of bromine with ammonium arsenite, titrated the bromide ion with weighed amounts of silver, and collected and weighed the silver bromide. The mean difference between the weight of the silver bromide and the sum of the weights of silver and bromine used was 0.5 part per million. The ratio AgBr/Ag thus obtained was 1.740785. The standard deviation of the mean of 8 determinations was 0.000006. The ratio agrees within the indicated precision with that obtained by BAXTER.

The Atomic Weights of Silver, Chlorine and Bromine

The excellent agreement of the Harvard and Munich determinations of the combining ratios of silver, chlorine and bromine provides very strong evidence that the values 107.880, 79.916 and 35.457, which have been accepted for many years as the atomic weights of silver, bromine and

chlorine are in a very reliable relation to one another. The accuracy of the values depends, however, on the accuracy of the relationship of any one of them to 16 as the assigned atomic weight of oxygen on the chemical scale. The classical effort to determine this relationship to oxygen was directed to silver. The value 107.880, which has been accepted for many years, was derived from the ratio $AgNO_3/Ag$, which was measured both at Harvard and at Munich with very good agreement. Other investigations, which tended toward a lower value, never resulted in a change in the International Table. The most extensive revision of the Table of Atomic Weights prior to the current one occurred in 1925. In that year the International Committee on Chemical Elements [A5] reported as follows: "We have retained the old value for the secondary standard, Ag = 107.880 although we are of the opinion that this value is slightly higher than the true one. If a more probable value (between 107.870 and 107.876) had been adopted for this secondary standard, many atomic weights dependent upon it (about 42 in number) would be lowered in the same proportion. Since the difference is of slight importance for most purposes, we believe it advisable to avoid the inconvenience of a change until more certain evidence has been obtained."

Changes in atomic weights are indeed an inconvenience to those who employ these quantities in their daily work. Reluctance to make changes without compelling evidence has always characterized the actions of the International Commission. The present situation, in which the adoption of a new scale resulted automatically in changes in atomic weights expressed to a precision of 1 part in 25000 or more provides the justification for the complete revision that the Commission undertook this year.

The following discussion deals with seven determinations that were selected as the most reliable of those that can be used to derive the atomic weight of silver. All the reported data were recalculated on the basis of the currently recommended values for the atomic weights of nitrogen, oxygen and iodine and the ratio for AgCl/Ag discussed above. The atomic weights are derived from physical measurements and are accurately known. The ratio AgCl/Ag, 1.328667, also appears to be accurate. In addition to the seven chemical determinations, two recent mass spectrometric determinations, in which calibration standards were employed, are included.

Silver converted to silver nitrate. RICHARDS and FORBES [R7] (1907). The observed ratio (1.574800) used in the recalculation was not adjusted, as it was by the authors, for supposed but unconfirmed traces of impurities in the silver nitrate. The operation involved no transfer of material. The value obtained is 107.8721, with a standard deviation of the mean of 0.0003. The variation of the isotopic composition of natural oxygen introduces an uncertainty not greater than ± 0.0005.

Silver nitrate converted to silver: HÖNIGSCHMID, ZINTL and THILO [H24] (1927). The observed ratio for $AgNO_3/Ag$ was 1.574790. The operation involved no transfer. The value obtained is 107.8740, with a standard deviation of the mean of 0.0004.

Synthesis of silver iodide: BAXTER and LUNDSTEDT [B38] (1940). The synthesis was accomplished by dissolving silver in nitric acid, reducing iodine to hydriodic acid with hydrazine, combining the solutions, collecting the silver iodide, and weighing it after fusion. One transfer was involved. The observed ratio, I/Ag, was 1.176433, from which the atomic weight of silver is 107.8722, with a standard deviation of the mean of 0.0004.

Conversion of silver iodide to silver chloride: The conversion of silver iodide to silver chloride was twice investigated in HÖNIGSCHMID's laboratory and twice in BAXTER's. Each of the experimental values for this ratio is combined for the purposes of the present calculation with the value of the

AgCl/Ag ratio, 1.328667, to avoid using an assigned value for the atomic weight of chlorine. The combined ratios give silver relative to iodine, which is mononuclidic.

AgI/AgCl Ratios

Hönigschmid and Striebel [H17] (1931); ratio, 1.638077; Ag = 107.8698, eight determinations, standard deviation 0.0003.

Hönigschmid and Striebel [H31] (1932); ratio, 1.638078; Ag = 107.8697, 16 determinations, standard deviation 0.0002.

Baxter and Titus [B37] (1940); ratio, 1.638064; Ag = 107.8714, 12 determinations, standard deviation 0.0004.

Baxter and Lundstedt [B39] (1940); ratio, 1.638072; Ag = 107.8704, 10 determinations, standard deviation 0.00014.

The average of the four values for silver obtained from these ratios is 107.8703 (AgCl/Ag = 1.328667).

The seven determinations discussed above yield the following values for the atomic weight of silver:

Richards and Forbes, $Ag/AgNO_3$	107.8721
Hönigschmid, Zintl and Thilo, $AgNO_3/Ag$	107.8740
Baxter and Lundstedt, AgI/Ag	107.8722
Hönigschmid and Striebel, AgI/AgCl	107.8698
Hönigschmid and Striebel, AgI/AgCl	107.8697
Baxter and Titus, AgI/AgCl	107.8714
Baxter and Lundstedt, AgI/AgCl	107.8704

There appears to be no justification for discriminating among these results on the basis of their relative precision or of suspected sources of systematic errors.

Both of the recent determinations of the isotopic abundance ratio of silver were based on calibrations with synthesized mixtures of the separated isotopes ^{107}Ag and ^{109}Ag. The results reported in terms of the atomic weight of silver on the ^{12}C scale (masses from EKMW) (1960) are:

(a) Shields, Craig and Dibeler [S5] (1960); Ag = 107.8685, with an estimated uncertainty of ±0.0013.

(b) Crouch and Turnbull [C7] (1962); Ag = 107.8694, with an estimated uncertainty of ±0.0026.

(The estimated uncertainties assigned to these values are not merely measures of precision, as are the standard deviations given for the values derived from chemical ratios, but include judgments concerning possible systematic errors. The estimates are for a confidence level of 95%.)

Because no valid judgment is possible concerning the relative accuracy of the individual values the Commission recommended that 107.870 ± 0.003 be taken as the atomic weight of silver for the 1961 Table of Relative Atomic Weights. It is to be hoped that further experimental work will lead to an increase in the accuracy that can be assigned to the atomic weight of this key element. It may be noted that 0.004 of the change of 0.010 from the previously accepted value is due to the change of scale. The remainder results from recalculation of experimental work applicable to the element and the inclusion of measurements involving silver iodide, as well as the recent mass spectrometric measurements.

The recommended values for the atomic weights of chlorine and bromine were derived from the new value for silver and the combining weight ratios previously discussed. The values thus obtained are 35.453 ± 0.001 for chlorine and 79.909 ± 0.002 for bromine. The changes from the previously accepted values for these elements are proportional to the change for silver.

Reliability of the Ratios of Chlorides and Bromides to Silver

The method that has been most extensively used for the chemical determination of atomic weights is to determine the weight of silver that is equivalent to a known weight of the chloride or bromide of an element. In brief, the procedure was as follows: after the approximately equivalent amounts of silver and the chosen halide had been allowed to react in solution, the equivalence point was determined by successive additions of small amounts of silver or halide ion, as needed, until a further addition of either ion produced equal opalescence in two portions of the solution. Efforts were made to minimize the occlusion of either of the reacting ions in the silver halide precipitate, and there was evidence that this necessary condition could be closely approached by using relatively dilute solutions and by prolonged contact of the silver halide with the supernatant solution. Opalescence was measured by a device known as the nephelometer. The entire procedure came to be known as the Harvard method because it was developed at Harvard University by RICHARDS and BAXTER and their associates. However, it was used by many other investigators, notably by HÖNIGSCHMID and his associates at Munich.

In many investigations the precipitated silver halide was collected and weighed, with appropriate corrections, if required, for the amount left in solution. When this procedure was followed, the investigation yielded not only ratios between the chosen halide and silver but between the chosen halide and the corresponding silver halide. It is clear that whereas the reliability of the first of these ratios required only an exact stoichiometric relation between silver and halogen in the precipitate, that is, a precipitate free of occluded silver or halide ions, the second ratio required also that the precipitate be free of significant amounts of any impurity that would not be volatilized during the preparation of the precipitate for weighing. That this condition was often fulfilled is evident from the many instances of close agreement in the values for atomic weights derived from the two ratios.

Although the "Harvard" method was thought by its users to be free of significant systematic errors, the degree of its accuracy was never determined objectively. In comparatively recent years it has been shown that the criterion of "equal opalescence", as marking the equivalence point, was not entirely valid. SCOTT [S2] (1961) has published a critical discussion of the procedure. He concludes that errors amounting to a few parts in one hundred thousand may occur and that the sign of the error depends upon whether the silver or the halide ion is in excess when the equivalence point is approached. He points out that few of the publications in which the procedure was involved contain the detailed information needed to judge the sign of the error or to estimate its magnitude. However, it appears that the usual laboratory practice tended to produce an approximate balance of these small errors in a series of determinations.

The very high accuracy of the atomic weights of mononuclidic elements derived from physical methods provides a new and reliable means for judging the accuracy of the chemical determinations for these elements. Table I compares atomic weights derived from physical measurements with those derived from halide-silver and halide-silver halide ratios in the Harvard and Munich laboratories for all the mononuclidic elements studied there. Limiting the data used in the table to those obtained at Harvard and Munich is not intended to disparage the work of other investigators who used the "Harvard" method. It is believed that the validity of this test of the method's accuracy is enhanced by using only the data obtained by the two most experienced groups.

In those instances in which work on a given element was repeated in

the same laboratory only the more recent value is given in the belief that the investigator regarded it as the better one. The large error in the chemically derived value for scandium must almost certainly be ascribed to other sources of error than those inherent in the method. The most likely source of error in this instance is inadequate purity of the scandium bromide. It is possible, but hardly useful, to speculate about the factors that caused the rather large errors in the values for aluminium, arsenic, and phosphorus. No plausible explanation can be offered for the error in the value for sodium, an element that would seem to be exceptionally well suited to the method.

Table I Comparison of Chemical with Physical Values for 15 Mononuclidic Elements

Element	*Physical Value*	*Chemical Value**	*Error %*	*Laboratory*	*Year*
Na	22.9898	22.9951	+.023	H	1905
Mn	54.9380	54.927	—.020	H	1906
P	30.9738	31.017	+.14	H	1912
Pr	140.907	140.913	+.004	H	1915
Th	232.038	232.097	+.025	M	1916
Sc	44.956	45.095	+.31	M	1919
Al	26.9815	26.959	—.083	H	1920
Bi	208.980	208.976	—.002	M	1921
Co	58.9332	58.939	+.010	H	1924
Y	88.905	88.919	+.016	M	1927
As	74.9216	74.904	—.023	H	1933
Nb	92.906	92.904	—.002	M	1934
Ho	164.930	164.928	—.001	M	1940
P	30.9738	30.969	—.016	M	1940
Cs	132.905	132.901	—.003	H	1940
Be	9.0122	9.0123	+.001	M	1947

* These values are not necessarily referred to in the element-by-element review.

The errors listed in the table are divided equally between positive and negative ones. This tends to confirm the opinion of SCOTT that errors in the determination of the equivalence points were as likely to be of one sign as the other. In spite of a few relatively large discrepancies, the results appear to justify a considerable degree of confidence in atomic weights derived from halide-silver ratios. By extension they may be regarded as offering useful evidence concerning the probable reliability of chemical determinations by the "Harvard" method for elements whose complex isotopic composition complicates the physical determination. Such evidence is presented in Table II for fourteen elements, of which all but two have five or more isotopes. Column 3 of the table lists the atomic weights calculated from the masses of the nuclides and their abundances. Column 4 gives the values derived from chemical determinations of halide-silver or halide-silver halide ratios. Column 5 lists atomic weights derived from other types of chemical ratios for the seven elements for which such measurements have been made. The agreement between the values in columns 4 and 5 tends to support the conclusion previously drawn from Table I—that the "Harvard" procedure can be regarded as highly trustworthy.

In appraising the reliability of an atomic weight derived from any chemical determination, consideration must always be given to errors from sources other than those inherent in the experimental ratio, particularly those associated with the purity or stoichiometry of the compounds used.

In reviewing the literature on atomic weights, many examples can be found of large errors resulting from incorrect assumptions about stoichiometric composition. These errors usually were unsuspected until some other procedure, chemical or physical, was applied to the determination of the atomic weight. Earlier revisions, especially during the period 1949 to 1955, have corrected most, if not all, significant errors arising from this source. Unfortunately, in this review it was seldom possible to find completely satisfactory evidence of the purity of the compounds used. Methods of evaluating purity that are commonplace today were not available even a few years ago. The lack of these advantages was offset, however, by the skill and experience of the investigators and their customary practice of repeating purification processes well beyond the stage at which impurities were no longer detected.

Table II Comparison of Chemical with Physical Values for 14 Polynuclidic Elements

Element	*No. of Nuclides*	*Physical Value*	*Chemical Value Harvard Ratio*	*Other Ratios*
Ti	5	47.88	47.90	
Ni	5	58.71	58.69	58.70
Cu	2	63.547	63.54	63.54
		63.550		
Zn	5	65.387	65.37	65.37
Ge	5	72.628	72.59	
Se	6	78.97	78.95	78.95
		78.99		
Mo	7	95.90	95.94	
		95.94		
Cd	8	112.42	112.40	112.40
		112.43		
Sn	10	118.73	118.69	118.69
Te	8	127.63	127.60	127.60
Ba	7	137.33	137.34	
		137.34		
W	5	183.85	183.91	
Hg	7	200.61	200.59	
Tl	2	204.38	204.37	

With the need for accurate knowledge of atomic weights so largely met for most of the elements, it is questionable whether chemists will again devote themselves to the exacting requirements of the chemical determination of these constants. However, investigators who may choose to enter this field have at their disposal better means of preparing pure substances and of evaluating their purity, and of determining the purity and completeness of reactions, than were available to the earlier workers. Further, the elements most in need of further study are now more easily identified by noting the existing discrepancies between chemical and physical measurements.

In distinction from chemical investigations of atomic weights, measurements of isotopic abundances are being made in many laboratories. Such measurements have increased rapidly in accuracy since they were first applied to the determination of atomic weights. It is to be expected that they will continue to become more reliable as means are found to eliminate or to measure the various systematic errors that are inherent in the technique in its present stage of development. Further improvement in the accuracy of atomic weights must be expected largely from this direction.

It is possible that in some instances another physical method may provide useful information on atomic weights, particularly to resolve discrepancies such as those shown in Table II. Crystal lattice measurements of substances of "known" atomic or molecular weight have heretofore been used, together with measurements of density, to derive Avogadro's number by means of the equation $N = \frac{nM}{dv}$ in which M is the atomic or molecular weight of the substance, d its density, n the number of atoms or molecules in the unit cell of the crystal, and v the volume of the unit cell. If N is taken as known, the same measurements yield M. Thus far this method has had little usefulness for the derivation of atomic weights. To yield results comparable in accuracy with other methods the crystals used must be not only of very high chemical purity but also physically excellent. Moreover it would appear difficult to defend experimental values based on X-ray spacing and density determinations carried out on different specimens. On large single crystals the density determination is not likely to be too demanding, but precise spacings are more readily obtained from powdered specimens. Until recently the limited accuracy with which Avogadro's number was known added significantly to the uncertainties inherent in this method of atomic weight determination.

In view of the several exacting requirements imposed on the method it is not surprising that the results thus far obtained from it have not contributed to the selection of values for atomic weights that have been included in the International Table. It is to be hoped that the currently active research on the solid state of matter will result in the availability of crystalline preparations of a sufficiently high degree of purity and crystallographic perfection, and that improvements in these respects and in the measurement of crystal lattice dimensions will prove to make the method useful.

In the following review the elements are listed in order of atomic number. The stable nuclides of the elements are listed and the recommended atomic weight is given. Evidence pertinent to the selection of the atomic weight is briefly presented. When a previous atomic weight is stated, it is understood that it is on the old scale, oxygen = 16.

The compilation of nuclidic masses by EVERLING, KÖNIG, MATTAUCH and WAPSTRA [E2] (1960) is referred to in the text as EKMW (1960) because of frequent citation. Similarly, the publication by BHANOT, JOHNSON and NIER [B4] (1960) is designated as BJN (1960) and Nuclear Data Tables [N9] (1959) as NDT (1959).

1 Hydrogen: ^{1}H, ^{2}H Atomic Weight 1.00797 ± 0.00001

For the 1938 Table the value of 1.0081 was adopted for hydrogen, based upon mass spectrometry by ASTON [A6] (1936), and by BAINBRIDGE and JORDAN [B1] (1937). The value was changed to 1.0080 in 1940 based upon the $^{1}H/^{2}H$ ratio measured by many workers. The deuterium content of natural hydrogen has been shown by FRIEDMAN [F2] (1953) to vary from 0.0135% to 0.0154% in fresh waters and from 0.0149% to 0.0156% in salt waters. The average of 0.0145% was chosen for the calculation of the atomic weight using the nuclidic masses from EKMW (1960). The natural variation corresponds to a range in the atomic weight of ±0.00001. For other mixtures of hydrogen and deuterium it is necessary to calculate the atomic weight from the composition. The masses for such computation are ^{1}H = 1.007825; ^{2}H = 2.014102.

2 Helium: ^{3}He, ^{4}He Atomic Weight 4.0026

In the 1938 Table the value of 4.003 was adopted for helium, based upon the mass spectrometry of ASTON [A6] (1936) and BAINBRIDGE and JORDAN [B1] (1937). The ^{3}He content in atmospheric helium is 0.000137% according to NIER [N1] (1959), and about 1/10 this amount in well helium. The effect of this minor isotope upon the atomic weight of helium is negligible. The mass is from EKMW (1960).

3 Lithium: ^{6}Li, ^{7}Li Atomic Weight 6.939

The recommended atomic weight of lithium has been 6.940 since 1925, based upon chemical ratios determined by RICHARDS and WILLARD [R9] (1910). The recalculated ratios are:

		Ratio	*Atomic Weight*
Comparison of chloride with Ag [R9]	LiCl/Ag	0.392992	6.9390
Comparison of chloride with AgCl [R9]	LiCl/AgCl	0.295786	6.9399
Chloride converted to perchlorate [R9]	$2O_2$/LiCl	1.50968	6.9385

The average, 6.939, is recommended for the present table.

The abundance measurements of CAMERON [C1] (1955) upon the Li_2I^+ ion produced by electron bombardment of vapor subliming from LiI indicate some variability of composition in nature. With masses of 6.01513 and 7.01600 from EKMW (1960), the calculated atomic weight varies between 6.942 and 6.943. Commercial sources of lithium are found to vary over a wider range. No "absolute" mass spectrometric measurements have been reported.

The atomic weight of beryllium was changed from 9.02 to 9.013 in the 1949 Table, based upon the ratios of beryllium chloride to silver and to silver chloride and the ratios of beryllium bromide to silver and silver bromide determined by Hönigschmid and Johannsen [H57] (1946–1947). An upper limit of 0.001 for the existence of ^{8}Be has been set by Nier [N3] (1937). For the present table the recommended value is the mass from EKMW (1960).

5 Boron: ^{10}B, ^{11}B Atomic Weight 10.811 ± 0.003

The atomic weight of 10.82 which appeared first in the 1925 Table was the result of comparisons of boron trichloride and boron tribromide with silver by Hönigschmid and Birckenbach [H15] (1922), and Baxter and Scott [B20] (1923). The possibility of alteration of the boron isotopic composition during the extensive purification of the halides and the strong indication from mass spectrometry that the composition of boron in nature is variable make the validity of this atomic weight dubious. In recent work by McMullen, Cragg and Thode [M7] (1961), the absolute $^{11}B/^{10}B$ in four samples of Searles Lake borax has been determined. Standards were carefully prepared from highly enriched and impoverished ^{10}B and used to establish the correction necessary for systematic errors in the mass spectrometry. An earlier observation by Thode, Macnamara, Lossing and Collins [T1] (1948) that the isotopic composition of boron in nature is variable has been confirmed with a new suite of minerals as well as by remeasurement of the samples used previously. McMullen in private communication to A. E. Cameron (23 June, 1961) reports the absolute $^{11}B/^{10}B$ for the earlier series of minerals to be from 3.95 to 4.15 with an accuracy estimated to be ±1% of the ratio. The suite of minerals now being measured gives a range of absolute $^{11}B/^{10}B$ from 3.95 to 4.10 with an accuracy somewhat better than ±1.0%.

For compositions corresponding to these ratios: $^{11}B = 79.798$, $^{10}B = 20.202$; and $^{11}B = 80.392$, $^{10}B = 19.608$, respectively, the atomic weights are 10.808 and 10.814 calculated with masses from EKMW (1960). The average, 10.811, is recommended for inclusion in the present table with a range of ±0.003 because of variation in natural isotopic composition.

The atomic weight of other than natural boron should be calculated from the measured isotopic composition using the EKMW (1960) masses: $^{10}B = 10.012939$ and $^{11}B = 11.009305$.

6 Carbon: ^{12}C, ^{13}C Atomic Weight 12.01115 ± 0.00005

The former value of 12.011 was adopted in 1953 based primarily upon masses determined by Li, Whaling, Fowler and Lauritsen [L5] (1951) from observations of energy changes accompanying nuclear reactions and upon the determination of the isotopic composition by Nier [N8] (1950). It replaced a value of 12.010 adopted in 1938 based upon work of Baxter and Hale [B34] (1937) upon hydrocarbon combustion.

The abundance of ^{13}C in nature varies from 1.1088% to 1.1151% according to Craig [C6] (1953). The nuclidic mass of ^{12}C is the exact number 12 and of ^{13}C is 13.003354 from EKMW (1960). The extremes of the natural variation give calculated atomic weights of 12.01119 and 12.01112, which are averaged to give a recommended value of 12.01115 with a range of ±0.00005.

7 Nitrogen: ^{14}N, ^{15}N Atomic Weight 14.0067

The previous value for nitrogen, 14.008, was introduced in the 1920 Table as a slight revision of 14.01 which had been recommended for the 1907 Table, based upon measurements by GRAY [G4] (1905) of the densities of nitric oxide and nitrogen and the analysis of the oxide.

The absolute $^{14}N/^{15}N$ ratio in atmospheric nitrogen has been determined by JUNK and SVEC [J2] (1958) to be 272 ± 0.3 by mass spectrometry. With nuclidic masses of $^{14}N = 14.003074$ and $^{15}N = 15.000108$ from EKMW (1960) the calculated atomic weight is 14.0067. Variations of up to 1.5% in the $^{14}N/^{15}N$ ratio in nitrogen of other origin have been demonstrated by HOERING [H10] (1955) and by PARWEL, RYHAGE and WICKMAN [P2] (1957). Variation of this magnitude causes an uncertainty of only 0.00005 in the atomic weight.

8 Oxygen: ^{16}O, ^{17}O, ^{18}O Atomic Weight 15.9994 ± 0.0001

The atomic weight of oxygen for the present table, 15.9994, is calculated from the abundances of ^{17}O and ^{18}O in atmospheric oxygen of 0.0374% and 0.2039%, respectively, determined by NIER [N8] (1950). The nuclidic masses from EKMW (1960) are $^{16}O = 15.994915$, $^{17}O = 16.999134$ and $^{18}O = 17.999160$. Various workers have shown that the ^{18}O content in fresh waters may be as much as 3% less than in atmospheric oxygen and 2.3% less in salt waters [R1] (1954) [D6] (1958). A variation of 3% in the $^{18}O/^{16}O$ ratio corresponds to a range of ± 0.00012 in the calculated atomic weight and probably adequately covers that encountered in normal chemical procedures. EPSTEIN [E1] (1959) reports that the $^{18}O/^{16}O$ ratios in nature may vary as much as 10% between the extremes of glacier ice found near the poles and that in atmospheric carbon dioxide. It is thus possible that a variation of ± 0.0003 may occur in the atomic weight.

EPSTEIN also discusses the observed variations in $^{18}O/^{16}O$ in minerals, where the deviations are not as extreme.

9 Fluorine: ^{19}F Atomic Weight 18.9984

The rounded value of 19.0 was adopted in the 1919–20 Table and 19.00 first appeared in 1925 based upon the simultaneous determination of the atomic weights of boron and fluorine using sodium tetraborate, by SMITH and VAN HAAGEN [S9] (1918). The borax was converted to sulfate, carbonate, nitrate, chloride and fluoride. The recommended value for the present table is the mass 18.9984, from EKMW (1960).

10 Neon: ^{20}Ne, ^{21}Ne, ^{22}Ne Atomic Weight 20.183

The recommended atomic weight of neon has been 20.183 since 1928, based upon gas density measurements made by BAXTER and STARKWEATHER [B27] (1928) and by BAXTER [B26] (1928). The results were recalculated by Prof. T. BATUECAS to give 20.183, which was recommended for inclusion in the present table.

Three measurements of the isotopic composition of neon are cited in NDT (1959). The results are not in good agreement. It is possible that, because of the method of extracting neon from atmospheric gases, fractionation may have occurred.

11 Sodium: ^{23}Na Atomic Weight 22.9898

The previous value for the atomic weight, 22.991, was adopted for the 1953 Table, based upon a mass measurement by HENGLEIN [H4] (1951), and

upon reaction energy calculations by Dr. K. WAY (private communication) and by LI [L6] (1952). It replaced a value which had been unchanged since 1905. For the present table the value, 22.9898, is the mass from EKMW (1960). WHITE, COLLINS and ROURKE [W4] (1956) have set upper limits for the existence of ^{21}Na as 0.000001% and ^{22}Na as 0.000003%.

12 Magnesium: ^{24}Mg, ^{25}Mg, ^{26}Mg Atomic Weight 24.312

The atomic weight of magnesium has been stated as 24.32 since the entire Table was recalculated in 1909. It was based upon chemical ratios measured by RICHARDS and PARKER [R5] (1897). The isotopic abundances measured by WHITE and CAMERON [W5] (1948) by electron bombardment of magnesium metal vapor, with masses from EKMW (1960), give a calculated atomic weight of 24.312, which is recommended in preference to the older chemical value.

13 Aluminium: ^{27}Al Atomic Weight 26.9815

The chemically derived value for the atomic weight of aluminium that had been in use since 1925 was replaced in 1951 by the value 26.98, which was based on mass measurements by MATTAUCH and EWALD [M3] (1943) and by MOTZ [M9] (1951). WHITE, COLLINS and ROURKE [W4] (1956) have established upper limits of 0.00015% for the existence of ^{25}Al and ^{26}Al and of 0.00005% for ^{28}Al, ^{29}Al, and ^{30}Al. For the present table the recommended value is 26.9815 from EKMW (1960).

14 Silicon: ^{28}Si, ^{29}Si, ^{30}Si Atomic Weight 28.086 ± 0.001

In the 1951 Table the recommended atomic weight of silicon was changed from 28.06, based upon chemical ratios, to 28.09 based upon nuclidic masses of DUCKWORTH, *et al.* [D3] (1950), and the average of three isotopic compositions cited by BAINBRIDGE and NIER [B2] (1951). The calculated value was 28.086. For the present table, the seven mass spectrometric determinations reported in NDT (1959) were averaged to give $^{28}Si = 92.21\%$; $^{29}Si = 4.70\%$; and $^{30}Si = 3.09\%$. With masses from EKMW (1960) the calculated atomic weight is 28.086, to which is assigned a range of ±0.001 because of the 1.3% variation in the $^{28}Si/^{30}Si$ in nature reported by ALLENBY [A2] (1954).

15 Phosphorus: ^{31}P Atomic Weight 30.9738

The previous atomic weight, 30.975, was adopted in 1951 based upon nuclear reaction data supplemented by mass spectrometric measurements reported by MOTZ [M9] (1951) and was in close agreement with the most recent chemical determinations of HÖNIGSCHMID and HIRSCHBOLD-WITTNER [H49] (1940). Upper limits for the possible existence of stable isotopes from masses 28 to 34 were set at 0.002% by KERWIN [K2] (1954). The recommended atomic weight is the mass 30.9738 from EKMW (1960).

16 Sulfur: ^{32}S, ^{33}S, ^{34}S, ^{36}S Atomic Weight 32.064 ± 0.003

In 1947 the Commission recommended the value of 32.066 for sulfur based upon chemical ratios. The demonstration of the variability of isotopic composition of this element in nature led, in 1951, to the recommendation that the atomic weight be published with a stated variability of ±0.003. The chemical measurements have been recalculated.

		Observed Ratio	*Atomic Weight*
Synthesis of silver sulfide [H30] (1931)	$Ag_2S/2Ag$	1.148621	32.0635
Synthesis of silver sulfide [H54] (1942)	$Ag_2S/2Ag$	1.148621	32.0635
Conversion of Na_2CO_3 to Na_2SO_4 [R10] (1915)	Na_2SO_4/Na_2CO_3	1.340155	32.0644

The measurements which prove the variability of the sulfur isotopic composition in nature have been reviewed by RANKAMA [R1] (1954) and by DUCKWORTH [D7] (1958). The abundances of the sulfur isotopes in virgin Texas sulfur determined by BRADT, MOHLER and DIBELER [B42] (1956) and by MACNAMARA and THODE [M1] (1950) in meteoritic sulfur with masses from EKMW (1960) both give a calculated atomic weight of 32.064. The agreement between the chemical and physical measurements is excellent, and 32.064 is recommended for the present table with a range of ± 0.003.

17 Chlorine: ^{35}Cl, ^{37}Cl Atomic Weight 35.453 $\pm$ 0.001

The recommended atomic weight of chlorine, 35.453, is based directly upon the atomic weight of silver by silver-silver chloride ratios determined chemically. The uncertainty stated derives entirely from the uncertainty assigned to the atomic weight of silver. Recent absolute mass spectrometric measurements of the abundance of the chlorine isotopes by SHIELDS, GARNER, MURPHY and DIBELER [S6] (1962) give $^{35}Cl = 75.7705$ (+0.035; —0.046%) and $^{37}Cl = 24.2295$ (—0.035; +0.046%). With masses from EKMW (1960) the calculated atomic weight is 35.4527 $\pm$0.0007. Standards were prepared from ^{35}Cl and ^{37}Cl of high chemical and isotopic purity and used to correct for systematic error in mass spectrometry. The agreement between chemical and physical methods is excellent.

Recent results of MEYERSON [M8] (1961) for the abundances observed in the mass spectra of certain chlorine containing organic compounds give $^{35}Cl = 78.80\%$ $\pm$0.06 (av. deviation). From this the calculated atomic weight is 35.452 in good agreement with the results of SHIELDS, GARNER, MURPHY and DIBELER.

18 Argon: ^{36}Ar, ^{38}Ar, ^{40}Ar Atomic Weight 39.948

The previous value for argon, 39.944, was introduced in 1931 based upon gas density measurements by BAXTER and STARKWEATHER [B29] (1929). The value 39.948 is recommended for the present table based upon the isotopic abundances $^{36}Ar = 0.337\%$; $^{38}Ar = 0.063\%$ and $^{40}Ar = 99.600\%$ measured by NIER [N8] (1950), and masses from EKMW (1960). Discrimination effects in the mass spectrometer were eliminated by calibrating with carefully prepared mixtures of high isotopic purity ^{36}Ar and ^{40}Ar.

19 Potassium: ^{39}K, ^{40}K, ^{41}K Atomic Weight 39.102

The previous value, 39.10, was recommended in 1951, based upon abundance measurements by NIER [N8] (1950) and masses determined by COLLINS, NIER and JOHNSON [C3] (1951). It replaced chemically measured values which over many years have ranged from 39.094 to 39.104. With NIER's abundances of $^{39}K = 93.083\%$, $^{40}K = 0.012\%$ and $^{41}K = 6.905\%$ and masses from EKMW (1960), the calculated atomic weight is 39.102, which is recommended for the present table. The abundance data of REUTERSWÄRD [R3] (1956) give a calculated atomic weight of 39.101.

20 Calcium: ^{40}Ca, ^{42}Ca, ^{43}Ca, ^{44}Ca, ^{46}Ca, ^{48}Ca Atomic Weight 40.08

In the 1931 Table the atomic weight of calcium was changed from 40.07 to 40.08, based upon the ratios of calcium chloride to silver and silver chloride measured by Hönigschmid and Kempter [H29] (1931). The ratios have been recalculated.

		Observed Ratio	*Atomic Weight*
Comparison of chloride with silver [H29] (1931)	$CaCl_2/2Ag$	0.514451	40.082
Comparison of chloride with silver chloride [H29] (1931)	$CaCl_2/2AgCl$	0.387200	40.083

An atomic weight of 40.078 was calculated from the abundances measured by Nier [N5] (1938) and masses from EKMW (1960). The Commission recommended the value, 40.08.

21 Scandium: ^{45}Sc Atomic Weight 44.956

The previous atomic weight, 44.96, based upon a mass measurement by Collins, Nier and Johnson [C3] (1951) was first used in the 1951 Table. Leland [L4] (1950) has set upper limits of % abundance of 0.001 for ^{41}Sc; 0.0002 for ^{42}Sc and ^{43}Sc; 0.0005 for ^{44}Sc; 0.002 for ^{46}Sc; 0.01 for ^{47}Sc; and 0.0002 for ^{48}Sc and ^{49}Sc by mass spectrometric measurement. For the present table the atomic weight recommended is 44.956 from EKMW (1960).

22 Titanium: ^{46}Ti, ^{47}Ti, ^{48}Ti, ^{49}Ti, ^{50}Ti Atomic Weight 47.90

The chemical ratios of Baxter and Butler [B24] (1926) and of Baxter and Butler [B25] (1928) upon which the atomic weight of 47.90 has been based since 1927 have been recalculated.

		Observed Ratio	*Atomic Weight*
Comparison of $TiCl_4$ with Ag [B24] (1926)	$TiCl_4/4Ag$	0.439680	47.901
Comparison of $TiBr_4$ with Ag [B25] (1928)	$TiBr_4/4Ag$	0.851788	47.893

The averaged abundances determined by Mattraw and Pachucki [M5] (1952) and Hogg [H12] (1954) with masses from EKMW (1960) give a calculated atomic weight of 47.88. The Commission recommended 47.90 for inclusion in the present table.

23 Vanadium: ^{50}V, ^{51}V Atomic Weight 50.942

The atomic weight of vanadium has been taken as 50.95 since a slight revision was made in the 1931 Table. It was based upon chemical ratios determined by Scott and Johnson [S3] (1930), by Briscoe and Little [B44] (1914) and by McAdam [M6] (1910), which have been recalculated.

		Observed Ratio	*Atomic Weight*
Conversion of $NaVO_3$ to NaCl [M6] (1910)	$NaVO_3/NaCl$	2.08639	50.946
Comparison of $VOCl_3$ with silver [B44] (1914)	$VOCl_3/3Ag$	0.535537	50.947
Comparison of $VOCl_3$ with AgCl [B44] (1914)	$VOCl_3/3AgCl$	0.403075	50.951
Comparison of $VOCl_3$ with silver [S3] (1930)	$VOCl_3/3Ag$	0.535529	50.944
Comparison of $VOCl_3$ with AgCl [S3] (1930)	$VOCl_3/3AgCl$	0.403088	50.957

The abundance of ^{50}V is 0.24% by averaging the determinations by Hess and Inghram [H8] (1949), Leland [L2] (1949), and by White, Collins and Rourke [W4] (1956). The latter workers also set upper limits of 0.0001% for ^{48}V and 0.00005% for ^{49}V. With masses from EKMW (1960) the calculated atomic weight is 50.942, which is recommended for the present table.

24 Chromium: ^{50}Cr, ^{52}Cr, ^{53}Cr, ^{54}Cr Atomic Weight 51.996 ± 0.001

The atomic weight of chromium has been taken as 52.01 since 1925, based upon the ratios $Ag_2CrO_4/2AgCl$ and $Ag_2CrO_4/2AgBr$ measured by Baxter, Mueller and Hines [B6] (1909) and the ratio $Ag_2Cr_2O_7/2AgBr$ measured by Baxter and Jesse [B7] (1909). Recalculation gives 51.997 and 52.007, respectively, for chromium by the two determinations.

Flesch, Svec and Staley [F1] (1960) have measured the abundances of the chromium isotopes in 18 chromites of various geological origins and found no variation within the limits of accuracy of the measurements, which were put upon an absolute basis by the use of separated isotopes. From their % abundances of $^{50}Cr = 4.352 \pm 0.024$; $^{52}Cr = 83.764 \pm 0.036$; $^{53}Cr = 9.509 \pm 0.027$; and $^{54}Cr = 2.375 \pm 0.018$, and masses from EKMW (1960) the calculated atomic weight is 51.9963 ± 0.0013 where the uncertainty arises entirely from the abundance measurements. The Commission recommended 51.996 ± 0.001 for the present table.

25 Manganese: ^{55}Mn Atomic Weight 54.9380

In 1953 the atomic weight was revised from 54.93 to 54.94 on the basis of mass measurements by Collins, Nier and Johnson [C4] (1952). Upper limits of 0.0004% for ^{53}Mn and of 0.0003% for ^{54}Mn have been set by White, Collins and Rourke [W4] (1956). The accuracy with which the mass of ^{55}Mn is expressed in EKMW (1960) allows the additional significant figures in the recommended atomic weight, 54.9380.

26 Iron: ^{54}Fe, ^{56}Fe, ^{57}Fe, ^{58}Fe Atomic Weight 55.847 ± 0.003

The atomic weight of iron was changed from 55.84 to 55.85 in 1940 on the basis of chemical determinations made by Hönigschmid and Liang [H48] (1939). The recalculated ratios follow:

		Observed Ratio	*Atomic Weight*
Comparison of ferrous bromide with silver [H48] (1939)	$FeBr_2/2Ag$	0.999645	55.845
Comparison of ferrous bromide with AgBr [H48] (1939)	$FeBr_2/2AgBr$	0.574244	55.844

As recalculated the results of this work are in remarkable agreement with a direct determination by Baxter and Hoover [B9] (1912) of the combining weight of iron with oxygen. The average of 12 experiments gave for the ratio $2Fe/Fe_2O_3$, 0.6994277, and for the atomic weight 55.8456. This work is cited primarily because of its historical significance.

Some support for the change was afforded by Nier's [N6] (1939) determination of the isotopic composition which, with the packing fraction then available, gave a calculated atomic weight of 55.851. For the present table it was felt desirable to attach another significant figure to the value but this did not seem justified by the chemical evidence. With % abundances of $^{54}Fe = 5.82$; $^{56}Fe = 91.66$; $^{57}Fe = 2.19$ and $^{58}Fe = 0.33$, which are the

average of the determinations reported by VALLEY and ANDERSON [V1] (1941) and by WHITE and CAMERON [W5] (1948) and masses from EKMW (1960) the calculated atomic weight is 55.847. VALLEY and ANDERSON found no differences between various terrestrial and meteoritic samples. The abundances reported by HIBBS [H9] (1949) give a calculated atomic weight of 55.846. The Commission felt it wise to assign, somewhat arbitrarily, an uncertainty of ± 0.003 to the recommended atomic weight, 55.847.

27 Cobalt: ^{59}Co Atomic Weight 58.9332

The atomic weight of this element has been stated as 58.94 since the 1925 Table, based upon a chemical determination by BAXTER and DORCAS [B22] (1924). The ratio has been recalculated.

		Observed Ratio	*Atomic Weight*
Comparison of $CoCl_2$ with silver [B22] (1924)	$CoCl_2/2Ag$	0.601859	58.939

The recommended atomic weight for the present table is the rounded mass, 58.9332, from EKMW (1960).

28 Nickel: ^{58}Ni, ^{60}Ni, ^{61}Ni, ^{62}Ni, ^{64}Ni Atomic Weight 58.71

In the 1955 Table an earlier chemical value of 58.69 was replaced by 58.71 which was based upon isotopic abundance measurements by WHITE and CAMERON [W5] (1948), and masses determined by COLLINS, NIER and JOHNSON [C4] (1952). With the same abundances and with masses from EKMW (1960) the calculated atomic weight is 58.71. The reliability of the abundance measurements does not justify an additional significant figure.

Recalculation of the chemical determinations from which the earlier chemical value was derived suggests that they be included in this report because they may be useful in studying the reliability of isotopic abundance measurements for elements that have numerous isotopes. One of the objects of the experimental work was to compare the atomic weights of meteoritic nickel with that of terrestrial origin. The following results are for terrestrial nickel.

		Observed Ratio	*Atomic Weight*
Comparison of $NiCl_2$ with silver [B19) (1923)	$NiCl_2/2Ag$	0.600731	58.696
Comparison of $NiCl_2$ with AgCl [B19] (1923)	$NiCl_2/2AgCl$	0.452118	58.692
Comparison of $NiBr_2$ with silver [B28] (1929)	$NiBr_2/2Ag$	1.012829	58.690
Comparison of $NiBr_2$ with AgBr [B28] (1929)	$NiBr_2/2AgBr$	0.581819	58.689
		Average	58.692

29 Copper: ^{63}Cu, ^{65}Cu Atomic Weight 63.54

In 1947 the atomic weight of copper was changed from 63.57 to 63.54 based upon the chemical determinations by HÖNIGSCHMID and JOHANNSEN [H55] (1944) and RUER and BODE [R12] (1924). The chemical ratios have been recalculated.

		Observed Ratio	*Atomic Weight*
Comparison of CuCl with Ag [H55] (1944)	CuCl/Ag	0.917675	63.537
Comparison of CuCl with AgCl [H55] (1944)	CuCl/AgCl	0.690673	63.536
Reduction of CuO to Cu [R12] (1924)	CuO/Cu	1.25181	63.538

The abundances determined by HESS, INGHRAM and HAYDEN [H7] (1948) with masses from EKMW (1960) give a calculated atomic weight of 63.547, while those reported by WHITE and CAMERON [W5] (1948) give 63.550. The Commission recommended 63.54 for the atomic weight of copper.

30 Zinc: ^{64}Zn, ^{66}Zn, ^{67}Zn, ^{68}Zn, ^{70}Zn — Atomic Weight 65.37

The chemical ratios upon which 65.38 as the atomic weight of zinc has been based since 1925 were recalculated, together with more recent measurements.

		Observed Ratio	*Atomic Weight*
Comparison of $ZnCl_2$ with Ag [H53] (1941)	$ZnCl_2/2Ag$	0.631681	65.373
Comparison of $ZnCl_2$ with AgCl [H53] (1941)	$ZnCl_2/2AgCl$	0.475426	65.373
Electrolytic reduction of $ZnBr_2$ to Zn (in mercury) [B13] (1916)	$ZnBr_2/Zn$	3.444605	65.376
Same reaction, $ZnCl_2$ [B16] (1921)	$ZnCl_2/Zn$	2.084684	65.370

The isotopic abundances measured by HESS, INGHRAM and HAYDEN [H7] (1948) and by LELAND and NIER [L1] (1948) are in excellent agreement. The averaged % abundances, $^{64}Zn = 48.89$; $^{66}Zn = 27.81$; $^{67}Zn = 4.11$; $^{68}Zn = 18.57$; and $^{70}Zn = 0.62$, with masses from EKMW (1960), give a calculated atomic weight of 65.387. The Commission recommended retaining the chemically determined value of 65.37 for the atomic weight.

31 Gallium: ^{69}Ga, ^{71}Ga — Atomic Weight 69.72

The atomic weight of gallium was changed to 69.72 in 1923, based upon the chemical ratio determination by RICHARDS and CRAIG [R11] (1923). Recalculation of that ratio and of a later one gave the following:

		Observed Ratio	*Atomic Weight*
Comparison of chloride with silver [R11] (1923)	$GaCl_3/3Ag$	0.544097	69.716
Conversion of metal to oxide [L7] (1935)	$2Ga/Ga_2O_3$	0.74396	69.733

Gallium samples of terrestrial and of meteoritic origin were compared by INGHRAM, HESS, BROWN and GOLDBERG [I4] (1948). The $^{69}Ga/^{71}Ga$ ratio was 1.510 for terrestrial and 1.509 for meteoritic samples. With % abundances of $^{69}Ga = 60.16$; $^{71}Ga = 39.84$ and masses from EKMW (1960), the calculated atomic weight is 69.72, in good agreement with the chemically determined value. The Commission recommended 69.72 for the present table.

32 Germanium: ^{70}Ge, ^{72}Ge, ^{73}Ge, ^{74}Ge, ^{76}Ge — Atomic Weight 72.59

The atomic weight of germanium has appeared as 72.60 since 1925. The ratios upon which this value was based have been recalculated together with more recent data.

		Observed Ratio	*Atomic Weight*
Comparison of chloride with silver [B21] (1924)	$GeCl_4/4Ag$	0.496928	72.602
Comparison of chloride with AgCl [B21] (1924)	$GeCl_4/4AgCl$	0.374010	72.605
Comparison of bromide with silver [B23] (1925)	$GeBr_4/4Ag$	0.909016	72.586

		Observed Ratio	Atomic Weight
Comparison of bromide with AgBr [B23] (1925)	$GeBr_4/4AgBr$	0.522195	72.593
Comparison of chloride with silver [H44] (1936)	$GeCl_4/4Ag$	0.496893	72.587
Comparison of chloride with AgCl [H44] (1936)	$GeCl_4/4AgCl$	0.373977	72.586
Comparison of bromide with silver [H39] (1935)	$GeBr_4/4Ag$	0.909000	72.579
Comparison of bromide with AgBr [H39] (1935)	$GeBr_4/4AgBr$	0.522175	72.578
		Average	72.590

Five determinations of the isotopic composition of germanium are quoted in NDT (1959). The determination by REYNOLDS [R4] (1953) appears most likely to be free of systematic errors and, with masses from EKMW (1960), the calculated atomic weight is 72.630. The results reported by GRAHAM, MACNAMARA, CROCKER and MACFARLANE [G3] (1951) on five of six terrestrial samples examined give a calculated atomic weight of 72.634. The sixth sample gives an atomic weight differing by 0.004 from the others. GRAHAM, *et al.*, and REYNOLDS examined fractionally distilled germanium halides and observed no isotope separation in the purification of the compounds. The isotopic composition determined by INGHRAM, HAYDEN and HESS [I6] (1948) gives a calculated atomic weight of 72.629. If all five determinations are averaged, assuming equal reliability, the calculated atomic weight is 72.628.

Thus, chemical ratio determinations give an atomic weight of 72.59 and physical measurements 72.63. The Commission recommended inclusion of the chemical value, 72.59, in the present table.

33 Arsenic: ^{75}As Atomic Weight 74.9216

The atomic weight, 74.91, which has appeared previously was introduced in the 1934 Table and was based upon the ratios $AsCl_3/3Ag$ and $AsBr_3/3Ag$ determined by BAXTER, SHAEFER, DORCAS and SCRIPTURE [B33] (1933). For the present table the recommended value is 74.9216 from EKMW (1960).

34 Selenium: ^{74}Se, ^{76}Se, ^{77}Se, ^{78}Se, ^{80}Se, ^{82}Se Atomic Weight 78.96

The atomic weight of 78.96 was introduced in the 1934 Table based upon the work of HÖNIGSCHMID and KAPFENBERGER [H32] (1933). Recalculation of their ratio and the ratios obtained more recently by HÖNIGSCHMID and GÖRNHARDT [H56] (1944) gave the following:

		Observed Ratio	Atomic Weight
Synthesis of silver selenide [H32] (1933)	$2Ag/Ag_2Se$	0.732081	78.954
Comparison of $SeOCl_2$ with Ag [H56] (1944)	$SeOCl_2/2Ag$	0.768794	78.954
Comparison of $SeOCl_2$ with AgCl [H56] (1944)	$SeOCl_2/2AgCl$	0.578624	78.955

The isotopic abundances reported by WHITE and CAMERON [W5] (1948) with masses from EKMW (1960) give a calculated atomic weight of 78.99. The determination by HIBBS [H9] (1949) gives an atomic weight of 78.97. The Commission recommended 78.96 for inclusion in the present table.

35 Bromine: ^{79}Br, ^{81}Br Atomic Weight 79.909 ± 0.002

The atomic weight of bromine has been unchanged at 79.916 since 1925. The change to 79.909 is a direct result of the new atomic weight for silver. The assigned uncertainty arises from that in the value for silver. CAMERON and LIPPERT [C2] (1955) compared bromines of several different origins and found no differences in isotopic composition within the precision of the measurements. With their % abundances of $^{79}Br = 50.537$ and $^{81}Br = 49.463$ and masses from EKMW (1960), the calculated atomic weight is 79.907.

36 Krypton: ^{78}Kr, ^{80}Kr, ^{82}Kr, ^{83}Kr, ^{84}Kr, ^{86}Kr Atomic Weight 83.80

In 1951 the atomic weight of krypton was based upon measurements of the abundances of the isotopes by NIER [N7] (1950) and masses measured by NIER. Recalculation with the same abundances and with masses from EKMW (1960) gave an atomic weight of 83.80, recommended for the present table.

37 Rubidium: ^{85}Rb, ^{87}Rb Atomic Weight 85.47

The previous atomic weight of 85.48 was introduced in the 1937 Table, based upon the ratios RbCl/Ag and of RbBr/Ag and RbBr/AgBr measured by ARCHIBALD, HOOLEY and PHILLIPS [A4] (1936), and ARCHIBALD and HOOLEY [A3] (1936). Recalculation of these ratios yields 85.473 for the atomic weight. The $^{85}Rb = 72.15\%$ and $^{87}Rb = 27.85\%$ measured by NIER [N7] (1950), with masses from EKMW (1960), give a calculated atomic weight of 85.468. The Commission recommended 85.47 for the present table.

38 Strontium: ^{84}Sr, ^{86}Sr, ^{87}Sr, ^{88}Sr Atomic Weight 87.62

The atomic weight of strontium has been recommended as 87.63 since 1911, based upon chemical ratios measured by THORPE and FRANCIS [T3] (1910) and by RICHARDS [R8] (1905). Recalculation of the ratios yields 87.63 for the atomic weight. The isotopic abundances determined by NIER [N4] (1938) with masses from EKMW (1960) give a calculated atomic weight of 87.616. The average of the four determinations cited in NDT (1959); $^{84}Sr = 0.560\%$, $^{86}Sr = 9.870\%$, $^{87}Sr = 7.035\%$, $^{88}Sr = 82.535\%$ also yields 87.616 for the calculated atomic weight. The Commission recommended 87.62 for inclusion in the present table.

39 Yttrium: ^{89}Y Atomic Weight 88.905

Since 1928 the atomic weight of yttrium has been 88.92, based upon chemical ratios measured by HÖNIGSCHMID and H. Frh. AUER VON WELSBACH [H22] (1927). COLLINS, ROURKE and WHITE [C5] (1957) and HESS [H5] (1956) have searched for other stable nuclides of yttrium and have set upper limits for their existence of 0.0005% or less from mass 85 to 95. For the present table the recommended value, 88.905, is from EKMW (1960).

40 Zirconium: ^{90}Zr, ^{91}Zr, ^{92}Zr, ^{94}Zr, ^{96}Zr Atomic Weight 91.22

The atomic weight of zirconium, 91.22, based upon chemical ratios, has been unchanged since 1927. The ratios have been recalculated.

		Observed Ratio	*Atomic Weight*
Comparison of bromide with Ag [H21] (1924)	$ZrBr_4/4Ag$	0.952244	91.24
Comparison of bromide with AgBr [H21] (1924)	$ZrBr_4/4AgBr$	0.547021	91.24

The investigators corrected the observed values by —0.03 for the presence of hafnium in the sample. The recalculated values, thus corrected, give 91.21. From the isotopic composition determined by WHITE and CAMERON [W5] (1948) and with masses from EKMW (1960), an atomic weight of 91.22 is calculated. The Commission recommended the adoption of this value.

41 Niobium: ^{93}Nb Atomic Weight 92.906

The previous atomic weight, 92.91, has been based since 1935 upon the chemical ratio of $NbCl_5/5Ag$ measured by HÖNIGSCHMID and WINTERSBERGER [H37] (1934). Recalculation yields 92.904. WHITE, COLLINS and ROURKE [W4] (1956) have set upper limits of 0.0001% to 0.0002% for the possible existence of other stable nuclides at masses 89 to 98. For the present table, the mass 92.906 is taken from EKMW (1960).

42 Molybdenum: ^{92}Mo, ^{94}Mo, ^{95}Mo, ^{96}Mo, ^{97}Mo, ^{98}Mo, ^{100}Mo Atomic Weight 95.94

The atomic weight of molybdenum has been stated as 95.95 since the publication of the 1938 Table. The chemical ratio measured by HÖNIGSCHMID and WITTMANN [H42] (1936) upon which this was based has been recalculated.

		Observed Ratio	*Atomic Weight*
Comparison of $MoCl_5$ with silver [H42] (1936)	$MoCl_5/5Ag$	0.506552	95.944

The isotopic abundance measurements of WILLIAMS and YUSTER [W8] (1946) with masses from EKMW (1960), give a calculated atomic weight of 95.90. The abundances reported by HIBBS [H9] (1949) give 95.94. The Commission recommended that the chemical basis for the assignment of the value be retained and that 95.94 be used in the present table.

44 Ruthenium: ^{96}Ru, ^{98}Ru, ^{99}Ru, ^{100}Ru, ^{101}Ru, ^{102}Ru, ^{104}Ru Atomic Weight 101.07

In the 1953 revision of the table, the atomic weight of ruthenium, 101.1, was based upon the abundance measurements by FRIEDMAN and IRSA [F3] (1953), and masses measured by GEIGER, HOGG, DUCKWORTH and DEWDNEY [G1] (1953). With the average of the % abundances reported by FRIEDMAN and IRSA, BALDOCK [B3] (1954) and WHITE, COLLINS and ROURKE [W4] (1956): $^{96}Ru = 5.51$; $^{98}Ru = 1.87$; $^{99}Ru = 12.72$; $^{100}Ru = 12.62$; $^{101}Ru = 17.07$; $^{102}Ru = 31.63$; $^{104}Ru = 18.58$; and with masses from EKMW (1960), the calculated atomic weight is 101.07. [Masses for ^{100}Ru and ^{101}Ru were taken as 99.9055 and 100.9046 by interpolation between ^{99}Ru and ^{102}Ru, since they did not appear in EKMW (1960).] The revised value of 101.07 was recommended for the present table.

45 Rhodium: ^{103}Rh Atomic Weight 102.905

The atomic weight of rhodium has appeared as 102.91 since 1925. It was based upon the chemical ratio of $Rh(NH_3)_5Br_3/Rh$ and of $Rh(NH_3)_5Cl_3/Rh$ measured by RENZ [R2] (1909) and DITTMAR [D1] (1909), respectively. The recalculated values are 102.904 and 102.914. For the present table, the recommended value, 102.905, is from EKMW (1960).

46 Palladium: ^{102}Pd, ^{104}Pd, ^{105}Pd, ^{106}Pd, ^{108}Pd, ^{110}Pd Atomic Weight 106.4

The value, 106.4, has appeared since 1955 based upon the isotopic abundances of SITES, CONSOLAZIO and BALDOCK [S7] (1953), and masses determined by HALSTED [H1] (1952). With masses from EKMW (1960), the recalculated atomic weight is 106.4, which is recommended for the present table.

47 Silver: ^{107}Ag, ^{109}Ag Atomic Weight 107.870 ± 0.003

The basis for the assignment of the atomic weight has been discussed in detail on pages 294–296.

48 Cadmium: ^{106}Cd, ^{108}Cd, ^{110}Cd, ^{111}Cd, ^{112}Cd, ^{113}Cd, ^{114}Cd, ^{116}Cd Atomic Weight 112.40

The change from the previous value of 112.41, in use since 1925, to 112.40, in the present table, has been based upon recalculation of the following chemical determinations:

		Observed Ratio	*Atomic Weight*
Comparison of chloride with silver [H45] (1936)	$CdCl_2/2Ag$	0.849661	112.400
Comparison of bromide with silver [H45] (1936)	$CdBr_2/2Ag$	1.26175	112.392
Comparison of bromide with AgBr [H45] (1936)	$CdBr_2/2AgBr$	0.724832	112.398
Electrolytic reduction of $CdCl_2$ to Cd [B11] (1915) (in mercury)	$CdCl_2/Cd$	1.630814	112.404
Electrolytic reduction of $CdBr_2$ to Cd [B13] (1916) (in mercury)	$CdBr_2/Cd$	2.421938	112.394
Electrolytic reduction of $CdCl_2$ to Cd [B13] (1916) (in mercury)	$CdCl_2/Cd$	1.630838	112.400
Electrolytic reduction of $CdSO_4$ to Cd [B17] (1921) (in mercury)	Cd/SO_4	1.17019	112.410
		Average	112.400

The isotopic abundances of LELAND and NIER [L1] (1948) with masses from EKMW (1960), give a calculated atomic weight of 112.42. The more recent determination by PALMER [P1] (1958) gives 112.43.

49 Indium: ^{113}In, ^{115}In Atomic Weight 114.82

The value, 114.82, was introduced in the 1955 Table, based upon the isotopic abundances measured by WHITE and CAMERON [W5] (1948) and masses measured by HALSTED [H1] (1952). The isotopic abundances by WHITE and CAMERON and by WHITE, COLLINS and ROURKE [W4] (1956) were averaged to give $^{113}In = 4.28\%$ and $^{115}In = 95.72\%$, which with masses from EKMW (1960) give a calculated atomic weight of 114.82, which is recommended for the present table.

50 Tin: Atomic Weight 118.69

^{112}Sn, ^{114}Sn, ^{115}Sn, ^{116}Sn, ^{117}Sn, ^{118}Sn, ^{119}Sn, ^{120}Sn, ^{122}Sn, ^{124}Sn

The value for tin has been 118.70 since 1925. The chemical ratios upon which this value was based have been recalculated.

		Observed Ratio	*Atomic Weight*
Electrolytic reduction of $SnCl_4$ to Sn [B15] (1920) (in mercury)	$SnCl_4/Sn$	2.194802	118.691
Comparison of $SnCl_4$ with silver [B45] (1915)	$SnCl_4/4Ag$	0.603742	118.691
Comparison of $SnBr_4$ with silver [B43] (1920)	$SnBr_4/4Ag$	1.015863	118.689

Four mass spectrometric determinations of the isotopic composition are reported in NDT (1959). The average of these abundances with masses from EKMW (1960) give a calculated atomic weight of 118.73, which is significantly higher than that from the chemical ratios. The Commission recommended 118.69 for inclusion in the present table.

51 Antimony: ^{121}Sb, ^{123}Sb Atomic Weight 121.75

The atomic weight of antimony, 121.76, has been essentially unchanged since 1925. The chemical ratios upon which it was based have been recalculated.

		Observed Ratio	*Atomic Weight*
Comparison of $SbCl_3$ with silver [H20] (1924)	$SbCl_3/3Ag$	0.70488	121.747
Comparison of $SbCl_3$ with AgCl [H20] (1924)	$SbCl_3/3AgCl$	0.53053	121.752
Comparison of $SbBr_3$ with silver [H20] (1924)	$SbBr_3/3Ag$	1.11699	121.742
Comparison of $SbBr_3$ with AgBr [H20] (1924)	$SbBr_3/3AgBr$	0.64167	121.749
Comparison of $SbCl_3$ with silver [W2] (1924)	$SbCl_3/3Ag$	0.704864	121.742
Comparison of $SbBr_3$ with AgBr [K3] (1927)	$SbBr_3/3AgBr$	0.641659	121.743
Comparison of $SbBr_3$ with silver [W7] (1921)	$SbBr_3/3Ag$	1.117074	121.769
Comparison of $SbBr_3$ with AgBr [W7] (1921)	$SbBr_3/3AgBr$	0.641682	121.756
		Average	121.750

The isotopic abundances of White and Cameron [W5] (1948) with masses from EKMW (1960) give a calculated atomic weight of 121.76. The Commission recommended 121.75 for inclusion in the present table.

52 Tellurium: Atomic Weight 127.60

^{120}Te, ^{122}Te, ^{123}Te, ^{124}Te, ^{125}Te, ^{126}Te, ^{128}Te, ^{130}Te

The previous value for the atomic weight of tellurium, 127.61, appeared first in the 1934 Table. It was based upon chemical ratios which have been recalculated, together with the results of a more recent investigation.

		Observed Ratio	Atomic Weight
Comparison of $TeBr_4$ with silver [H35] (1933)	$TeBr_4/4Ag$	1.03649	127.589
Comparison of $TeBr_4$ with AgBr [H35] (1933)	$TeBr_4/4AgBr$	0.595426	127.598
Synthesis of Ag_2Te [H36] (1933)	$Ag_2Te/2Ag$	1.59145	127.599
Comparison of $TeCl_4$ with silver [H38] (1935)	$TeCl_4/4Ag$	0.624425	127.615
Comparison of $TeCl_4$ with AgCl [H38] (1935)	$TeCl_4/4AgCl$	0.469960	127.612
		Average	127.603

The average of the isotopic abundances of WHITE and CAMERON [W5] (1948) and of WILLIAMS and YUSTER [W8] (1946) with masses from EKMW (1960), give a calculated atomic weight of 127.63. The Commission recommended 127.60 for inclusion in the present table.

53 Iodine: ^{127}I Atomic Weight 126.9044

The previous value for iodine, 126.91, was adopted by the Commission in 1951, based upon then unpublished mass measurements by NIER. It replaced a value of 126.92 which had been obtained from chemical ratios. The value, 126.9044, recommended for the present table is the mass from EKMW (1960).

54 Xenon: Atomic Weight 131.30
^{124}Xe, ^{126}Xe, ^{128}Xe, ^{129}Xe, ^{130}Xe, ^{131}Xe, ^{132}Xe, ^{134}Xe, ^{136}Xe

In 1955 the Commission recommended the atomic weight of 131.30 for xenon, basing it upon the isotopic composition measured by NIER [N7] (1950) and the masses reported by HALSTED [H1] (1952). With the same abundances and the masses from EKMW (1960), the calculated atomic weight is 131.29. The Commission recommended 131.30 for the present table, based on an earlier calculation which was slightly in error.

55 Caesium: ^{133}Cs Atomic Weight 132.905

The value of 132.91 has appeared since 1934 based upon the CsCl/Ag ratio determined by BAXTER and THOMAS [B31] (1933). BAXTER and HARRINGTON [B40] (1940) redetermined the ratio and found 132.912 which, when recalculated, yields 132.901. WHITE, COLLINS and ROURKE [W4] (1956) have set very low values for the possible existence of other stable nuclides of caesium. The Commission recommended the mass 132.905, from EKMW (1960), for the present table.

56 Barium: Atomic Weight 137.34
^{130}Ba, ^{132}Ba, ^{134}Ba, ^{135}Ba, ^{136}Ba, ^{137}Ba, ^{138}Ba

The atomic weight of barium had been unchanged at 137.36 since 1929. The ratios upon which it was based have been recalculated.

		Observed Ratio	*Atomic Weight*
Conversion of $Ba(ClO_4)_2$ to $BaCl_2$ [H26] (1929)	$BaCl_2/4O_2$	1.627095	137.354
Comparison of $BaCl_2$ with silver [H26] (1929)	$BaCl_2/2Ag$	0.965273	137.342
Comparison of $BaCl_2$ with AgCl [H26] (1929)	$BaCl_2/2AgCl$	0.726509	137.345
		Average	137.347

The isotopic abundances measured by NIER [N4] (1938) with masses from EKMW (1960) give a calculated atomic weight of 137.33. Abundances reported by THODE (T2] (1958) with the same masses give 137.34. The Commission recommended 137.34 for inclusion in the present table.

57 Lanthanum: ^{138}La, ^{139}La Atomic Weight 138.91

The atomic weight of lanthanum has been taken as 138.92 since 1933, based upon an average of the chemical ratios determined by BAXTER and BEHRENS [B30] (1932) and BAXTER, TANI and CHAPIN [B18] (1921). Recalculation of these results gives 138.913 and 138.900. With the % isotopic composition: $^{138}La = 0.089$ and $^{139}La = 99.911$, reported by INGHRAM, HAYDEN and HESS [I1] (1947) and by WHITE, COLLINS and ROURKE [W4] (1956) and masses from EKMW (1960), the calculated atomic weight is 138.905. The Commission recommended 138.91 for the present table.

58 Cerium: ^{136}Ce, ^{138}Ce, ^{140}Ce, ^{142}Ce Atomic Weight 140.12

The value, 140.13, which has appeared in the tables since 1929 was based upon the ratios $CeCl_3/3Ag$ and $CeCl_3/3AgCl$ determined by HÖNIGSCHMID and HOLCH [H25] (1929). Recalculation of these ratios yields 140.114. The isotopic abundances determined by INGHRAM, HAYDEN and HESS [I1] (1947) and by HIBBS [H9] (1949), with masses from EKMW (1960), give a calculated atomic weight of 140.12. The Commission recommended this value for inclusion in the present table.

59 Praseodymium: ^{141}Pr Atomic Weight 140.907

The atomic weight of praseodymium has been taken as 140.92 since 1925. It was based upon the chemical ratios $PrCl_3/3Ag$ and $PrCl_3/3AgCl$, measured by BAXTER and STEWART [B10] (1915) which, when recalculated, yield 140.913. The atomic weight of 140.907 recommended for the present table is the mass from EKMW (1960). Very low limits for the existence of other stable nuclides of this element were set by COLLINS, ROURKE and WHITE [C5] (1957).

60 Neodymium: ^{142}Nd, ^{143}Nd, ^{144}Nd, ^{145}Nd, ^{146}Nd, ^{148}Nd, ^{150}Nd Atomic Weight 144.24

The atomic weight of neodymium has been taken as 144.27 since 1925, based upon chemical ratios determined by BAXTER and CHAPIN [B8] (1911) and BAXTER, WHITCOMB, STEWART and CHAPIN [B14] (1916). For the present table, the Commission recommended the value, 144.24, based upon masses from EKMW (1960) and % isotopic abundances of $^{142}Nd = 27.11$; $^{143}Nd = 12.17$; $^{144}Nd = 23.85$; $^{145}Nd = 8.30$; $^{146}Nd = 17.22$; $^{148}Nd = 5.73$; and $^{150}Nd = 5.62$, which are the averages of the abundances measured by INGHRAM, HESS and HAYDEN [I5] (1948) and by WALKER and THODE [W1] (1953).

62 Samarium: Atomic Weight 150.35
^{144}Sm, ^{147}Sm, ^{148}Sm, ^{149}Sm, ^{150}Sm, ^{152}Sm, ^{154}Sm

In 1955 the value, 150.35, for the atomic weight was based upon isotopic abundance measurements by INGHRAM, HAYDEN and HESS [I6] (1948) and masses reported by HOGG and DUCKWORTH [H11] (1954). The unweighted averages of five isotopic abundance measurements cited in NDT (1959) with masses from BJN (1960) give a calculated atomic weight of 150.37. The latest abundance measurement by AITKEN, LITTLER, LOCKETT and PALMER [A1] (1957) gives 150.38. The Commission recommended that 150.35 be retained in the present table.

This element deserves further study, both because of the disparity among the several isotopic abundance determinations and because the chemical determinations of STEWART and JAMES [S10] (1917), OWENS, BALKE and KREMERS [O1] (1920) and HÖNIGSCHMID and HIRSCHBOLD-WITTNER [H52] (1941) all yield higher values, ranging from 150.36 to 150.43.

63 Europium: ^{151}Eu, ^{153}Eu Atomic Weight 151.96

The value, 152.0, had been unchanged since 1909 and was based upon chemical ratios determined by JANTSCH [J1] (1908). More recent determinations of the ratio $EuCl_2/2Ag$ by BAXTER and TUEMMLER [B36] (1938), and of the same ratio, as well as $EuCl_2/2AgCl$, by KAPFENBERGER [K1] (1938) yielded 151.95 and 151.89, respectively. The abundances measured by HESS [H6] (1948) and by COLLINS, ROURKE and WHITE [C5] (1957) were averaged, giving $^{151}Eu = 47.82$ and $^{153}Eu = 52.18$ which, with masses from BJN (1960) give a calculated atomic weight of 151.96 which the Commission recommended for the present table.

64 Gadolinium: Atomic Weight 157.25
^{152}Gd, ^{154}Gd, ^{155}Gd, ^{156}Gd, ^{157}Gd, ^{158}Gd, ^{160}Gd

The former value, 157.26, was adopted in 1955 and was based upon isotopic abundance measurements by HESS [H6] (1948) and LELAND [L5] (1950) and masses measured by HOGG and DUCKWORTH [H11] (1954). With the same abundances and with masses from BJN (1960) the calculated atomic weight is 157.25, which the Commission recommended for the present table.

65 Terbium: ^{159}Tb Atomic Weight 158.924

The value for this element was revised in 1953 to 158.93 on the basis of the mass interpolated from the packing fraction curve. Very low abundance limits have been set for the existence of other stable nuclides of the element by COLLINS, ROURKE and WHITE [C5] (1957). The Commission recommended the new value of 158.924 based on the mass of ^{159}Tb from EKMW (1960).

66 Dysprosium: Atomic Weight 162.50
^{156}Dy, ^{158}Dy, ^{160}Dy, ^{161}Dy, ^{162}Dy, ^{163}Dy, ^{164}Dy

The atomic weight of dysprosium, 162.51, adopted in 1955, was based upon abundance measurements by INGHRAM, HAYDEN and HESS [I7] (1949) and masses measured by HOGG and DUCKWORTH [H11] (1954). With the same abundances and masses from BJN (1960), the recommended atomic weight is 162.50.

67 Holmium: ^{165}Ho — Atomic Weight 164.930

The atomic weight of this element has been taken as 164.94 since 1941. It was based upon the ratio $HoCl_3/3Ag$ measured by HÖNIGSCHMID and HIRSCHBOLD-WITTNER [H50] (1940). Recalculation yields 164.928. Low upper limits for the existence of other stable nuclides of this element have been set by COLLINS, ROURKE and WHITE [C5] (1957). The Commission recommended the atomic weight of 164.930 from BJN (1960).

68 Erbium: ^{162}Er, ^{164}Er, ^{166}Er, ^{167}Er, ^{168}Er, ^{170}Er — Atomic Weight 167.26

The previous value, 167.27, was adopted in 1955. It was based upon isotopic measurements by HAYDEN, HESS and INGHRAM [H3] (1950) and masses measured by HOGG and DUCKWORTH [H11] (1954). With masses from BJN (1960) the same isotopic abundances, as well as those measured by LELAND [L4] (1950), give a calculated atomic weight of 167.26 which is recommended for the present table.

The results of a chemical determination by HÖNIGSCHMID and WITTNER [H46] (1937), which yielded 167.24, cannot be regarded as trustworthy because of uncertainties in the corrections applied for the presence of other rare earths and yttrium.

69 Thulium: ^{169}Tm — Atomic Weight 168.934

In 1953 the Commission derived 168.94 as the atomic weight of this element from its position on the packing fraction curve. For the present table the mass, 168.934, measured by BJN (1960) was recommended.

70 Ytterbium: ^{168}Yb, ^{170}Yb, ^{171}Yb, ^{172}Yb, ^{173}Yb, ^{174}Yb, ^{176}Yb — Atomic Weight 173.04

The atomic weight of ytterbium has been taken as 173.04 since 1934. This value was based upon measurements by HÖNIGSCHMID and STRIEBEL [H33] (1933), which yield 173.03 when recalculated. A later determination, by HÖNIGSCHMID and HIRSCHBOLD-WITTNER [H51] (1941), for which more thoroughly purified and evaluated material appears to have been used, yields 173.09 on recalculation. With masses from BJN (1960) and the average of the % abundances measured by HAYDEN, HESS and INGHRAM [H2] (1949) and by LELAND [L4] (1950): $^{168}Yb = 0.135$; $^{170}Yb = 3.03$; $^{171}Yb = 14.31$; $^{172}Yb = 21.82$; $^{173}Yb = 16.135$; $^{174}Yb = 31.84$; and $^{176}Yb = 12.73$, the calculated atomic weight is 173.04. The Commission has recommended this value for the present table.

71 Lutetium: ^{175}Lu, ^{176}Lu — Atomic Weight 174.97

The value, 174.99, was accepted by the Commission for inclusion in the 1940 Table, based upon chemical ratios determined by HÖNIGSCHMID and WITTNER [H47] (1939) and isotopic abundances measured by MATTAUCH and LICHTBLAU [M2] (1939). Recalculation of the chemical measurements yields 174.97. The abundances determined by HAYDEN, HESS and INGHRAM [H3] (1950) and COLLINS, ROURKE and WHITE [C5] (1957), when averaged, give $^{175}Lu = 97.41\%$ and $^{176}Lu = 2.59\%$. With masses from BJN (1960), an atomic weight of 174.97 is calculated. This value is recommended for the present table.

72 Hafnium: Atomic Weight 178.49
^{174}Hf, ^{176}Hf, ^{177}Hf, ^{178}Hf, ^{179}Hf, ^{180}Hf

In the 1955 Table the value of 178.50 was introduced, based upon abundances measured by HIBBS [H9] (1949) and masses determined by HOGG and DUCKWORTH [H11] (1954). For the present table the % abundances of HIBBS [H9] (1949) and of REYNOLDS [R4] (1953) and WHITE, COLLINS and ROURKE [W4] (1956) have been averaged: $^{174}Hf = 0.18$; $^{176}Hf = 5.20$; $^{177}Hf = 18.50$; $^{178}Hf = 27.13$; $^{179}Hf = 13.75$; and $^{180}Hf = 35.24$, and with masses from BJN (1960) give a calculated atomic weight of 178.49.

73 Tantalum: ^{180}Ta, ^{181}Ta Atomic Weight 180.948

In 1953 the chemically determined value for tantalum was replaced by 180.95, derived from the position of the element on the packing fraction curve. At that time the element was thought to consist of the single nuclide ^{181}Ta. WHITE, COLLINS and ROURKE [W3] (1955) have reported the existence of stable ^{180}Ta. The abundance of ^{180}Ta is 0.0120% by averaging the results of WHITE, COLLINS and ROURKE [W4] (1956) and PALMER [P1] (1958), and with masses from BJN (1960), the calculated atomic weight is 180.948 which is recommended for the present table.

74 Tungsten: Atomic Weight 183.85
^{180}W, ^{182}W, ^{183}W, ^{184}W, ^{186}W

In 1955 the atomic weight of tungsten, 183.86, was accepted based upon abundance measurements by WILLIAMS and YUSTER [W8] (1946) and masses measured by DUCKWORTH, JOHNSON, PRESTON and WOODCOCK [D2] (1950); DUCKWORTH, KEGLEY, OLSON and STANFORD [D5] (1951); and GEIGER, HOGG, DUCKWORTH and DEWDNEY [G1] (1953). The unweighted average of % abundances measured by WILLIAMS and YUSTER [W8] (1946), MATTAUCH and SCHELD [M4] (1948), WHITE and CAMERON [W5] (1948) and HIBBS [H9] (1949) are: $^{180}W = 0.14$; $^{182}W = 26.29$; $^{183}W = 14.31$; $^{184}W = 30.66$; and $^{186}W = 28.60$. With masses from BJN (1960) the calculated atomic weight is 183.85, recommended for the present table.

In view of the general reliability of measurements by HÖNIGSCHMID and his associates, the work of HÖNIGSCHMID and MENN [H43] (1936) on the ratio $WCl_6/6Ag$ should not be neglected in future consideration of this element. Recalculation of the measurements yields 183.91.

75 Rhenium: ^{185}Re, ^{187}Re Atomic Weight 186.2

In 1955 the atomic weight of rhenium was taken as 186.22, based upon abundances measured by WHITE and CAMERON [W5] (1948) and masses estimated from the packing fraction curve. From the same abundances and masses of BJN (1960), the Commission recommended the more conservative value, 186.2, for the present table.

76 Osmium: Atomic Weight 190.2
^{184}Os, ^{186}Os, ^{187}Os, ^{188}Os, ^{189}Os, ^{190}Os, ^{192}Os

In 1938 the atomic weight of osmium was changed to 190.2, based upon the isotopic composition reported by NIER [N2] (1937) and a packing fraction of -1×10^{-4}. There has been no other measurement of the isotopic composition. Recalculation with NIER's abundances and masses from BJN (1960) gives 190.2, which is recommended for the present table.

77 Iridium: ^{191}Ir, ^{193}Ir Atomic Weight 192.2

The value of 192.2 was chosen for the 1953 Table based upon abundances measured by SAMPSON and BLEAKNEY [S1] (1936), and masses estimated from the packing fraction curve. The only more recent measurement of the isotopic composition is that of BALDOCK [B3] (1954). With his abundances and masses from BJN (1960) the calculated atomic weight is 192.22. The Commission recommended retaining 192.2 as the value.

78 Platinum: ^{190}Pt, ^{192}Pt, ^{194}Pt, ^{195}Pt, ^{196}Pt, ^{198}Pt Atomic Weight 195.09

In 1955 the value of 195.09 was adopted, based upon isotopic abundance measurements by INGHRAM, HESS and HAYDEN [I2] (1947) and by LELAND [L3] (1949) and masses measured by DUCKWORTH, WOODCOCK and PRESTON [D4] (1950); by DUCKWORTH, JOHNSON, PRESTON and WOODCOCK [D2] (1950); and by HOGG and DUCKWORTH [H11] (1954). The average of the abundances of INGHRAM, HESS and HAYDEN [I2] (1947) and of WHITE, COLLINS and ROURKE [W4] (1956) with masses from BJN (1960), give a calculated value of 195.09. The Commission recommended retention of this value in the present table.

79 Gold: ^{197}Au Atomic Weight 196.967

The rounded value, 197.0, estimated from the packing fraction curve was adopted for the 1953 Table. For the present table the mass, 196.967, is taken from BJN (1960).

80 Mercury: ^{196}Hg, ^{198}Hg, ^{199}Hg, ^{200}Hg, ^{201}Hg, ^{202}Hg, ^{204}Hg Atomic Weight 200.59

The atomic weight of mercury, 200.61, has been unchanged since 1925. The chemical ratios upon which it has been based were recalculated.

		Observed Ratio	*Atomic Weight*
Comparison of $HgCl_2$ with silver [H19] (1923)	$HgCl_2/2Ag$	1.25847	200.596
Comparison of $HgBr_2$ with silver [H19] (1923)	$HgBr_2/2Ag$	1.67056	200.589

The masses of BJN (1960) with the isotopic abundances of NIER [N8] (1950) give a calculated atomic weight of 200.61. The Commission recommended the value, 200.59, for inclusion in the present table.

81 Thallium: ^{203}Tl, ^{205}Tl Atomic Weight 204.37

The atomic weight of thallium has been stated as 204.39 since 1925. The chemical ratios have been recalculated.

		Observed Ratio	*Atomic Weight*
Comparison of TlCl with silver [H16] (1922)	TlCl/Ag	2.22324	204.368
Comparison of TlCl with AgCl [H16] (1922)	TlCl/AgCl	1.67332	204.372
Comparison of TlBr with silver [H27] (1930)	TlBr/Ag	2.63539	204.371
		Average	204.370

The isotopic abundances determined by WHITE and CAMERON [W5] (1948) and by HIBBS [H9] (1949) with masses from BJN (1960), give a calculated atomic weight of 204.38. The Commission recommended the value, 204.37, for the present table.

82 Lead: ^{204}Pb, ^{206}Pb, ^{207}Pb, ^{208}Pb Atomic Weight 207.19

The atomic weight of lead has been taken as 207.21 since 1937. The chemical determinations have been recalculated.

		Observed Ratio	*Atomic Weight*
Comparison of $PbCl_2$ with silver [B32] (1933)	$PbCl_2/2Ag$	1.28905	207.194
Comparison of $PbCl_2$ with silver [B35] (1937)	$PbCl_2/2Ag$	1.28906	207.196
Comparison of $PbCl_2$ with silver [H34] (1933)	$PbCl_2/2Ag$	1.28903	207.189

The isotopic composition of "common" lead is variable because it has been affected by contributions of radiogenic lead. The Commission recommended using 207.19 as the value for the present table, since it was felt that it quite well represented the lead most likely to be encountered in normal laboratory work.

The atomic weights of leads of widely differing isotopic composition should be calculated from the composition and the masses of the individual species. The masses from EKMW (1960) are:

^{204}Pb	203.9749
^{206}Pb	205.9762
^{207}Pb	206.9759
^{208}Pb	207.9766

83 Bismuth: ^{209}Bi Atomic Weight 208.980

The atomic weight of bismuth has been stated as 209.00 since 1925, based upon chemical ratios determined by HÖNIGSCHMID [H13] (1917), and by HÖNIGSCHMID and BIRCKENBACH [H14] (1921).

Recalculation of those ratios yields 209.976. For the present table the mass from EKMW (1960), 209.980, is recommended by the Commission.

90 Thorium: ^{232}Th Atomic Weight 232.038

The atomic weight, 232.05, of this element was based, in 1953, upon the mass measured by STANFORD, DUCKWORTH, HOGG and GEIGER [S11] (1952). For the present table the Commission recommended the mass from EKMW (1960), 232.038.

92 Uranium: ^{234}U, ^{235}U, ^{238}U Atomic Weight 238.03

The atomic weight of uranium was changed to 238.07 in 1937, based upon measurements of the ratio $UCl_4/4Ag$ by HÖNIGSCHMID and WITTNER [H41] (1936). Recalculation yields 238.05. Natural uranium contains 0.0056% ^{234}U, as measured by WHITE, COLLINS and ROURKE [W4] (1956). The ^{235}U abundance has been carefully determined by mass spectrometric comparison to gravimetric standards prepared from separated ^{235}U and ^{238}U of very high chemical and isotopic purity. The accepted abundance of ^{235}U in natural uranium is 0.7205%, determined by BOARDMAN and MESERVEY and quoted by GREENE, KIENBERGER and MESERVEY [G5] (1955). With these abundances and masses from EKMW (1960), the calculated atomic weight is 238.03, which the Commission recommended for the present table.

A variation of 0.1% of the ^{235}U content in certain ores has been reported by SMITH [S8] (1961) and by SENFTLE, STIEFF, CUTTITTA and KURODA [S4] (1957). Others also have observed variations of this magnitude. This causes a range of ±0.0024 in the atomic weight and is not significant for the recommended value.

The atomic weight of other than naturally occurring uranium must be calculated from the isotopic composition and masses. The masses from EKMW (1960) are listed for such use. The uncertainty does not exceed ±1 in the last decimal place.

^{233}U	233.0395
^{234}U	234.0409
^{235}U	235.0439
^{236}U	236.0457
^{237}U	237.0486
^{238}U	238.0508

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